

POPULAR Computing WEEKLY

Only 50p.

3-9 July 1986

Vol 5 No 27

Commodore to clash with Atari

KNIGHT GAMES

Olympic
games
circa 1386
Full colour
review - p16



- Souped-up 68000 machines due from Atari and Commodore this Autumn
- Both machines will have massively increased memory and processing power
- Sound and graphics industries targeted by Commodore

Full details below and inside
COMMODORE and Atari are set for a head-to-head confrontation this Autumn as both companies plan souped-up versions of their 68000 processor machines.

Prototype versions of Commodore's Amiga 2, which features a full 68020 processor and improved blitter and sound, are already thought to be in circulation in the United States, with an announcement of the machine predicted for September, while Atari is also working on a 68020 machine with a built-in blitter chip.

In Atari's case the new machine will move in at the top of the range, leaving cheaper versions of the ST to sell into mass markets while the more powerful model is used for specialised graphic and sound tasks. Commodore's current version of the Amiga is however too expensive for this to be an option, and the Amiga 2 is

Get Into the swing with Leader Board
Our Pick of the Week on page 44

Continued on page 4 ►

Red Moon

Voted
"BEST ADVENTURE OF THE YEAR"

Commodore Computing International
Amstrad Computer User
Computer and Video Games

Voted
"BEST GRAPHICAL ADVENTURE 1985"

Zzap! 64
Amix
Crash

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The Price of Magik

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fast response.

NEW

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◀ HARDWARE

13 Special forces

Communications is a continuing growth area for computer owners and while it sometimes seems that the Amstrads, Commodores and BBCs get all the goodies, there's something new for Spectrum owners. John Lettice plugs in the Spectre comms pack and files his report

Some of our features are missing

Apologies to those of you looking for the Amstrad supplement this week. Unfortunately, it was a casualty of technical difficulties and, all things being equal, will appear next week



◀ SOFTWARE

14 DIY games

Games creators are nothing new, but while many have taken the pain out of programming, they've also taken the quality out of the games. John Minson looks at the latest of the kind, from Argus Software

14 ST utility

If you're struggling to get to grips with machine-code programming on your ST, Microdeal has something that might help. Duncan Evans checks out the *Kissed* (?!?) debugger

GAMES ▶

16 Reviews

In full colour this week, the long-awaited *Knight Games* on the Commodore 64, and Mirrorsoft's *Action Reflex* for the Spectrum. Plus *Murder on the Mississippi*, *Speed King* and *Floyd the Droid*

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20 Adventure Corner



◀ PROGRAMMING

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Continuing our series on computer languages, John Mawhood examines the benefits of Prolog, best known for its use in artificial intelligence research

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ABC

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QL pressure group formed

QL RESCUE plans received a shot in the arm last week after an information seminar organised by the magazine *QL World* at the instigation of Colin Hughes of Transform. The seminar was attended by representatives of companies from France, Italy, Denmark, the United States, Holland and the UK, and Hughes was voted chairman of a new pressure group to market the QL.

"It'll be called the Independent QL Suppliers' Group or something," says Hughes, but he intends to issue a press statement outlining the group's plans by the end of this week.

In the short term the group will attempt to maintain interest in the machine, possibly in conjunction with CST's Thor upgrade, but in the longer term

if the machine is to survive it will be necessary for someone to buy the rights to it from Amstrad. The CST Thor is now being marketed by Eidersoft, and according to an Eidersoft spokesman the machine is now to be marketed as "the ultimate QL add-on". It appears that any plans to restart production of QL circuit boards, and to base the machine on these, have been abandoned.

There are however, abundant supplies of QLs at the moment, and although export distributor PST's deal with Amstrad means it can only sell its 20,000 outside the UK other companies have sufficient stocks in both component and assembled form.

CST hopes to sell 5-10,000 Thors, but the fact that the



The QL: Abundant supplies for upgrade

machine has a 3½ inch disc drive and no Microdrive is concerning some software houses. Veronica Cullen, who attended the seminar for Talent, was doubtful over the economics of software houses going over to disc for this sort of volume, and similar volumes for later machines wouldn't help much either. "It's going to be expensive to support the QL compatibles," she said, and although Talent intends to con-

tinue to produce QL titles for some time yet producing them in both disc and Microdrive format would be difficult.

It's not yet certain whether or not a buyer will be found for the rights to the QL in the longer term, or indeed whether Amstrad will be willing to sell the machine, but of the possible buyers it would seem that Thorn EMI a long-standing Sinclair component manufacturer, is currently the front runner.



Miracle's WS4000

New Miracle modem

MIRACLE TECHNOLOGY is set to launch an auto-dial, auto-answer, Hayes compatible modem for £176.40 including VAT. The new WS4000's standard version supports V21 and V23 standards, and offers speeds of 300, 600, 1200, 1200/75 and 75/1200 baud.

It can also be upgraded to include V22 1200 Baud full du-

plex and 2400 baud full duplex, and has options of DTMF tone dialing, battery-backed internal telephone directory, process control port and approved Bell standards to be used for transatlantic communications purposes.

Details from Miracle Technology, ST PETERS Street, Ipswich IP1 1XB (0473 216141).

Cheetah Amdrom now on sale

CHEETAH intends to start shipment of its £34.95 Amdrom digital drum machine for the Amstrad this week, and expects them to appear in the

shops by next week. Latin and Electro kits with kit editors should also be available for the Amdrom at that time.

Details from Cheetah Marketing, 1 Willowbrook Science Park, Crickhowell Road, St Mellons, Cardiff (0222 777337).

Commodore to clash with Atari

◀ Continued from page 1
liable to supplant it.

Atari is thought to be scheduled its new machine for a September launch, and to differentiate it from the current top of the range 1040ST it is likely to have at least two megabytes of memory. The company is also likely to take advantage of the extra memory and the blitter to try to widen the ST's appeal into more specialised fields.

This is the route Commodore intends to take with its current Amiga in the UK. The company has recently appointed eight new dealers who specialise in graphic design rather than in computers, the idea being that these dealers will be able to sell the machine as part of a graphics solution rather than as a computer.

"The graphics industry is an ideal area for fully utilising the Amiga's abilities", said Commodore acting general manager Chris Kaday. "This represents the first of many vertical

market areas into which we will be launching the Amiga".

Commodore's hit list of these areas consists of graphics, business, desktop publishing, education and music, and it hopes to develop a small but lucrative market in each of them. But the advent of a more powerful blitter-based Atari machine later in the year is likely to mean Commodore will need the support of the Amiga 2 to succeed.

In the United States Atari would seem to be winning the 68000 war. Initial reports after the launch of the Amiga and the ST were that the Amiga was holding its own, and possibly doing better, despite a higher price. Atari however now claims worldwide sales of 200,000 STs, and predicts 500,000 by the end of the year. This is a tough target to achieve, but the company now seems to have sorted out its US distribution, and is managing to get the ST into the major chain stores.

Enterprise is beamed down

ENTERPRISE Computers has gone into receivership just shy of three years into its lifespan. The company announced its micro, first called the Eian, and subsequently the Eian then the Enterprise due to legal problems, on September 14 1983, but September 14 1984 had come and gone before the high specification micro finally came out of the traps. The Z80-based machine had looked attractive when first announced, but although its launch specification exceeded that of competing micros such as the

Spectrum and the Oric it arrived too late to reap the benefit of the home micro boom, and like the Memotech (recently dead, buried and resurrected itself) it existed on low sales and a small but determined band of enthusiasts.

A spokesman for receiver Grant Thornton wasn't able to comment on whether or not there would be an attempt to rescue the company, but given the current financial climate in the micro industry the chances of this happening look bleak.

Debts run into six figures.

Domark's new signing is trivial

DOMARK, which was recently forced to redesign its 'unauthorised' *Spitting Images* game, appears to have learned the error if its ways and has bought the rights to produce the computer version of *Trivial Pursuits*. The company intends to launch the game for the Spectrum, 64, Amstrad and BBC at the PCW show in September, and claims advance orders of over 40,000 units - enough to produce a hit game.

It is intended that the game will feature many of the standard questions, but will also have additional questions designed to take advantage of sound and graphics. It will cost £14.95.



Mark Strachan and Dominic Wheatley check their new game for signs of life.

Gold bows to telex pressure

TELECOM Gold is to drop its 50p charge for receipt of incoming telexes today (Thursday). The charge has been levied since the electronic mail service began its telex service two years ago, and has caused a considerable number of complaints from subscribers, particularly those who found that some of their telex traffic turned out to be junk mail.

Phone trouble for Software Discounts

MAIL ORDER software discount house Software Discounts appears to have had its phone disconnected. *Popular Computing Weekly* would welcome information from anyone knowing the company's new phone number, and/or its current status.

SID meeting

THE CREDITOR'S meeting for Software International Distribution, which went into liquidation recently, is to be held in London on 17 July.

Any readers owed software from the company's discount software offer should write to *Popular Computing Weekly* giving their details as soon as possible.



Enterprise: Boldly gone...

Robtek launches 50 game King Size

ROBTEK is to launch a new "King Size" range of budget tapes which will consist of 80 games for £9.95 over a variety of formats. The company hoped to launch the Commodore 64 version this week, with C16/Plus 4, MSX, Atari, Spectrum and Amstrad versions fol-

lowing through July.

Budget utilities, including a turbo loader for the C16/Plus 4 at £4.95, are also planned for release shortly.

Details from Robtek, Unit 4, Isleworth Business Complex, St Johns road, Isleworth, Middx TW7 6NI (01 847 4457).

Coming soon: a PC glut?

THE LAUNCH of Spectrum's IBM compatible machine, manufactured by Bondwell, (see last week's issue) seems to have triggered a price war between Spectrum and the machine's main UK distributor, Barbatan.

On hearing of Spectrum's pricing Barbatan dropped the prices of its own Bondwell machines, making Spectrum's "Amstrad cruncher" look a lot less revolutionary. The price level for the basic 640K machine is £290, which - excluding very small production run machines and "one-offs" is a new low for the UK.

Trade prices of £250 for IBM compatibles are however becoming more and more a reality here.

This is unlikely to please Alan Sugar, who has traditionally attacked "soft" markets with its products. The PCW series, for example, is based on tried and tested Z80 technology, using the CP/M operating system. Small manufacturers had actually been doing this for some time, with £250-£400 5.1 inch drive CP/M machines having been on the market for some time prior to the advent

of the PCWs.

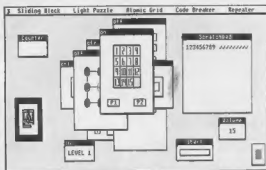
But Amstrad scored with the marketing of the PCW. It was available in quantity through easily accessible dealerships and sold into new markets as a word-processor/typewriter. Because it was relatively hassle-free, and was perceived as good value, it sold.

Now Amstrad probably intends to do this with its PC. In order to sell it must be perceived as being something that is exceptionally good value. But there's the rub.

With the PCW Amstrad didn't have any serious competition, as most of the manufacturers of CP/M machines had already moved over to the IBM/MSDOS standard. This time round they're still with IBM, and will be forced either to withdraw from the low-end PC market, as Apricot has, or cut prices.

Even if it's simply a case of their having nowhere else to go at the moment, many of them will think in terms of price cuts.

If Sugar has a new angle to his PC that will make it difficult from the price-cutting opposition it will succeed. But if not he has a fight on his hands.



Compumart cuts prices for discs

MAIL ORDER company Compumart has cut the price of its blank discs. Amsoft 3 inch discs are down from £40 a box of ten to £32, while 3½ inch discs £19 for single sided and £24 for double.

The company's 5¼ inch discs are now £9.95 for a plastic box of ten, with two free discs being given free with every ten purchased. All orders are subject to a £1 charge for postage and packing.

Details from Compumart, Unit 6, Falcon Street, Loughborough, Leics LE11 1EH (0509 282259/233893).

A mice pair

ZAP ZONE and MIND GAMES are two new BBC packages designed to be used with the AMX Mouse. Zap Zone comes on tape and is a mouse powered arcade game, while Mind Games is a collection of five intelligence testing games. It costs £14.95 on disc, while Zap Zone is £4.95.

Details from Advanced Memory Systems, 166-170 Wilderspool Causeway, Warrington WA4 6QA (0925 413501/2/3)

C compiler for BBC 68000

DELCOMM'S DMS 68000 sec-

ond processor for the BBC micro and Master series is now available with a C compiler at no extra cost. The DMS 68000 currently comes with 128K Ram, and can be expanded to 15 megabytes. A 256K expansion board is currently under development.

The current system includes the board, two Eproms containing linking software and a cross assembler, user manual, assembler manual and a guide to 68000 assembly language. System software includes assembler, monitor and the C compiler, the complete package costing £351.76.

Details from Delcomm Microcomputer Systems, 46 Nasmith Road, Southfield Industrial estate, Glenrothes, Fife (0592 775022).

The last word on home WP

WORD PROCESSING is a user group and by-monthly magazine designed for users of home word processors. It currently concentrates on Amstrad machines, with some coverage of the BBC micro, but plans to expand to further micros, and to other serious software, eg databases and spreadsheets, in future issues.

The group's aim is to produce easy to understand information for the new user. It has also managed to secure discounts, including £20 off NewWord, for members. Membership (including the magazine) is £6 a year.

Details from Word Processing, PO Box 67, Wolverhampton, West Midlands.

Hantarex launches mono monitor

THE HANTAREX HX12 is a high resolution 12 inch monochrome monitor featuring 80 column display, 18Mhz band width and audio input. It costs £79.50. Details from Hantarex, Unit 2, Lower Sydenham Trading Estate, Kangley Bridge Road, London SE26 5BA (01 778 1414).



Diary Dates

JULY

16-18 July
PC User Show
Olympia, London

Details: Hardware and software for IBM machines and their compatibles.
Organiser: ENAP, 01-608 1161.

24-27 July

Acorn User Exhibition
Barbican Centre, London

Details: Hardware, software and peripherals for the Electron, BBC micro and Master machines.
Trade only 10am-1pm on 24 July.
Price: £3 adults, £2 children, £1 discount for advance sales.
Organiser: Editionscheme, 01-349 4667.

SEPTEMBER

3-7 September
Personal Computer World Show
Olympia, London

Details: Software and hardware for home, educational and business computer users. For the first time this year the show is to be organised in three separate halls - business, games and education.
Price: £2.
Organiser: Montbuild, 01-487 5831.

8th September
Official Commodore Computer Show
UMIST, Manchester

Details: A wide range of Commodore hardware, software and peripherals. Formerly the Commodore Horizons show.
Price: £3 adults, £2 children, £1 discount for advance booking.
Organiser: Database Publications, 061-456 8383.

26-28 September
Electron and BBC Micro User Show

UMIST, Manchester

Details: Software, hardware and peripherals for the Electron, BBC micro, and Master machines. Produced by Acorn.
Price: £3 adults, £1 children, £1 discount for advance booking.
Organiser: Database Publications, 061-456 8383.

OCTOBER

3-5 October
The Amstrad Computer Show
Norwell, London

Details: Home and business software and hardware for the Amstrad range of computers.
Price: £3 adults, £2 children, £1 discount for advance booking.
Organiser: Database Publications, 061 456 8383.

30-31 October
Hampshire Computer Fair

Guidhall, Southampton

Details: Business computers and communications.
Price: Free entry by business registration.
Organiser: Testwood Exhibitions, 0703 31557.

NOVEMBER

22 November
The 6809 Christmas Show
Royal Horticultural Hall, Westminster, London
Details: Dragon software and peripherals.

Prices, dates and venues of shows can vary, and you are therefore strongly advised to check with the show organiser before attending. *Popular Computing Weekly* cannot accept responsibility for any alterations to show arrangements made by the organiser.

THE IMAGE SYSTEM

This is THE IMAGE SYSTEM: a computer graphics package with a difference!

In addition to providing the usual drawing and painting facilities THE IMAGE SYSTEM allows you to zoom, move, copy, scale, rotate and even twist and fold your pictures in 3D SPACE.

With facilities like these you can produce an almost infinite variety of effects from the simplest of images. Gone are the days of spending hours to create a single picture. THE IMAGE SYSTEM sets you free to experiment and use your imagination.

—And there's more: using features like transparency and colour filtration you can modify and combine your images using the full range of colours available on the AMSTRAD.

The pictures you produce can be controlled from basic adding graphic flair to your program. THE IMAGE SYSTEM even COMPRESSES pictures saving valuable memory space.

You will find an explanation of all the features mentioned, and more in the comprehensive manual which accompanies the program including a fully illustrated step by step exercise to take you through the all important first half hour of using this program.

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ROOM TEN

ROOM TEN

The stunning game of the future by the author of the legendary TAU CETI.

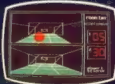
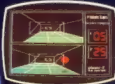


Room Ten is simple Addictive fun with a capital F. Well put together with neat graphics, terrific Sound and totally absorbing Game play.

"COMPUTER AND VIDEO GAMES"

A crisp combination of simple but effective ideas add up to an addictive and challenging game.

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Citizen patriot

I'm writing this letter as I was surprised that the Citizen 120D printer was not listed in the supplement (*Popular Computing Weekly*, June 19).

I've had my Citizen for more than a month and I've continually used it without fault with my QL. It is compatible with Epsoms and an IBM Graphics printer through its Centronics or the optional RS232 interface. The interfaces are on cartridges which means that changing from a parallel to a serial printer takes only a few seconds and not a costly business in sending it back to the factory. It prints at the speed of 120 CPS in draft mode and 25 CPS in NLQ.

NLQ, italic, emphasized, condensed and pica can be selected through the front panel by pressing a combination of the On Line, LF and FF buttons. A fully comprehensive manual comes with the printer which is a credit to Citizen.

It works well with Quill although I did have difficulty printing in NLQ at first. The problem was that Quill was

programmed to send the code, Chr\$(27); @, to initialise the printer to the present DIL switches before sending the letter. Therefore the only way to print in NLQ was to set the option in the DIL switches, which was impractical.

The solution was to load the install bas program as described in the information section of the User Guide. You then select the option to edit the Epson code and delete the Esc@ from the preamble code.

In my opinion the Citizen 120D is better than most of the printers listed in the supplement, better even than the Epson FX-80 and RX80, Seikosha 700A, 100, and 250X, Brother HR15 and HR-5 and perhaps even better than the Centronics GLP.

The Citizen 120D printer sells at the reasonable price of £160 from some shops which is much lower than its competitors.

Rhys Miles
Little Quarry
Heol Las
Energlyn
Caerphilly

Brain storm

I have recently purchased a second hand New Brain AD computer as manufactured by Grundy Business Systems, who I believe ceased trading, but I understand that the New Brain was rescued.

Would it be possible for you to send me a list of any back issues of *Popular Computing Weekly* which feature articles or listings for this computer together with the name and address of the company that rescued the New Brain if they are still trading, also any additional information, names of publications etc. that may be of help to me.

Also if any of your readers could help me with listings, software or secondhand hardware for this computer I would be most grateful.

A J R Yates
68 Lansdowne Crescent
Carlisle
CA3 9EP

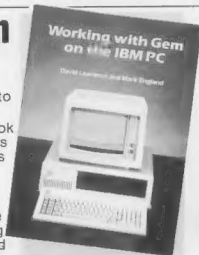
I'm afraid we never covered the New Brain in much depth Mr Yates - perhaps one of our readers could help?



Scotty! ... Scotty!

The jewel in the crown

- Working with GEM on the IBM PC is the indispensable book for anyone who wants to understand and make the most of the GEM operating system that has brought the IBM PC into the era of windows, icons and mice.
- Fully illustrated in the way that only a GEM book could be, working with GEM on the IBM PC ranges from the simple techniques to exploit fully GEM's Desktop user interface, to analysis of the functioning of the GEM software, user-friendly, graphics-based system.
- This is the first book to take full account of the changes in GEM since its early versions. Working with GEM is the definitive handbook for users and enquirers alike.



To Theresa Lacy, Sunshine Books
12/13 Little Newport Street
London WC2H 2PP

Please send me _____ copies of
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I enclose a cheque/postal order for £ _____ payable to
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is a humorous arcade game in which you play a binman working in the neatly kept streets of suburbia.

In this time of high unemployment our Public Health Operative must impress his employers by working very hard.

Laden with heavy bins, he has to follow the dustcart. He can pick up a nice bonus by helping out the eccentric locals but too much tramping on well tended lawns may make the household pet a man-eater.

A game no Amstrad owner can **REFUSE** - available from all good software retailers - or drop us a **LITTER!**

Name

Address

Spectrum ☐ Amstrad CPC 464/664/6128 ☐

Tick appropriate box.

TRASHMAN costs **£7.95**. Please make cheques payable to **Virgin Games Ltd** and post to the address below. Please do not post cash.

Virgin Games Mail Order, 2/4 Vernon Yard, Portobello Road, London W11 2DX

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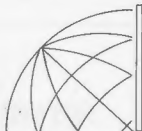
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A
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D

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► **The Last Word - Sinclair User Classic Award.** £13.95.

KEYBOARDS



► **Saga 1 Emperor - "Good looks ... works remarkably well..."**
Sinclair User. £39.95.



► **Saga 3 - "The best," Chris Jenkins, Popular Computing Weekly. The Last Word available with it free.** £69.95.

► **Saga 2 + - "Well done, Saga," Sinclair User.** £54.95.

► **Saga 2001. Infra red remote transmission, out of this world. The Last Word available with it free.** £119.95.

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► **LTR1 Printer. Letter quality printer for only** £119.95



► **The Citizen 1200 Precision dot matrix, with 2 year warranty. "The 1200 is an excellent printer," Sinclair User.** £235.00

► **The GLP (Great Little Printer)**

Dot matrix printer, 100 cps, letter quality mode. £199.95

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BARGAIN BASEMENT

AN EPSON PRINTER FOR £39.95?

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- ★ Friction feed



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2790107

File copy

In your issue dated November 21, 1985 you published a comprehensive database called *Com Filing System* by Wail Sabbagh. The final part of this program was in December 5, 1985.

After entering the complete listing I found the program useful and would recommend it to any small business user.

However, on return from holiday I discovered that my copy had gone missing. I would therefore be obliged if you could advise me whether the program is available on tape and at what cost.

James C Hardie
Kilsyth
Glasgow

You are the hands of the author. If you'd care to write to him care of the magazine, we'll pass on your request.

Bigger and better

The Character Expansion program for the Amstrad CPC machines (vol 5 issue 21) from Brian Cadge works very well. My only regret is that it works on expansion only, and not on contraction.

It is indeed interesting to use smaller characters in mode 1, preserving the four-colour screen. We could also imagine the 80-column size as 16 colours in mode 0.

I would appreciate it if someone could suggest the modifications needed to make these improvements.

Jose L van der Zypen
Brussels
Belgium

Ancient games

Recently a friend of mine arrived back from Nigeria and brought a board game called Ayo.

Having played the game several times I was fascinated with its complexity. A visit to the library revealed that the game is a version of Mancala, one of the oldest board games known.

Can anyone tell me whether the game has been computerised, and where it is available?

B Clegg
Oldham
Lancs

Einstein theory

I have been an Einstein user for two years and am surprised at the lack of support from the computing press.

It must be the most versatile home micro available.

Since joining the UK Einstein Users Group, the amount of information I get is wonderful.

For any Einstein owners out there who still feel out of it, can I suggest that they contact Jean Skillern, subscription secretary, UKEUG, 36 Nelson Row, Ford, Nr Arundel, Sussex.

Chris Giles
Portsmouth
Sussex

Which Amstrad

Whenver we are given a program in *Popular* the name of the computer is given at the top of the page. Spectrum and QL programs are not presented as "Sinclair", nor C64 items as "Commodore".

So why can't we be told more than just the fact that a program is written for the Amstrad.

Anyone considering buying a word processing system might be persuaded to get a PCW8256 on the belief that they could also type in programs from magazine listings.

Alan Baker
Porsmouth

Right you are Mr Baker, which is why we started putting 8256 in the top of programs for that machine some weeks ago - see Better Basic, Vol 5 issue 16, for example.

Shock review

I simply had to write and tell you about a strange experience I had the other day I read a John Minson Review that I agreed with! The shock of this was no small trauma, I can tell you! You must realise the importance of this unique discovery, the first of its kind.

I refer to that wonderful offspring of St Brides, *The Snow Queen*. I enjoyed John's review immensely... almost as much as the game.

I have considered *Quill* to be a competent atmospheric, but in the hands of St Brides it creates pathos, humour, sympathy and overwhelming atmosphere in enormous dollops.

One incongruity is that in the light of their previous anarchic outpourings it is not unlike watching Brian Rix play Hamlet. One expects farce and instead we are treated to a wonderful story beautifully portrayed.

I must be mellowing in my

old age as I not only enjoyed John Minson's style but I only found one bone to pick with him... my CBM64 has a RAM-SAVE facility. (What it doesn't have is a TEXT-only mode).

After 150 adventures I have begun to tire of the 'dubious morality' of most adventure scenarios. It is so nice to find one that requires one to do the 'right thing'. The image of the little girl setting off down the hill alone was a real tear jerker!

Hugh T Walker
7, Burnet Avenue
Burghaw
Guildford
GU1 1YD

Going public

I have been into computing for quite some years and have a variety of machines (Spectrum, Amstrad).

During that time I have written quite a few routines of various sizes and was wondering what to do to get them published in *Popular Computing Weekly*?

Richard Leadbetter
Cecil Park
London N8

We are always looking for new listing ideas. What you must do is send us a working copy of the program together with some documentation you'd anticipate being published with it, marking the whole lot for the attention of technical editor Duncan Evans.

We pay £25 per page - or £5 for something appearing in Bytes & Pieces.

Puzzle

Puzzle No 215

In the following cross-number puzzle, numerical values and not words have to be fitted into the grid.

| | | | | |
|---|--|--|--|---|
| 1 | | | | |
| 2 | | | | 3 |
| 4 | | | | |

1. A² 1. B
2. B² 3. A
4. A² B

Can you find the correct values for A and B?

Solution to Puzzle 210

He has 126 blocks which fit into a $5 \times 5 \times 5$ cube with one left over. These same blocks could be arranged to form a right-angled triangle with sides of 28, 45, and 53 units.

To solve this problem we need to find a right-angled triangle with integral sides and hypotenuse, in which the sum of these values is just one more than a perfect cube. Lines 1 to 50 do this, the two sides being taken and the length of the hypotenuse is calculated using Pythagoras' theorem. If this is an integral value the program

calls the subroutine which checks to see if the sum of the three sides is one greater than a cube. Because of the inaccuracies in the calculation of cube roots directly, the program uses a circumscribed method of multiplication to check if the value is an exact cube (lines 100 to 140).

As soon as a value is found, the program stops.

Winner of Puzzle No 210

The winner this week is D. Tiley of Cottingham, Humberside. £10 is on its way.

Rules

The closing date for puzzle No. 215 is July 29.

Spectacular Spectre communications

John Lettice takes a hard look at the latest Spectrum hardware

It's an ill wind that blows nobody good, and the conspicuous lack of QL owners beating a path to Tandata's door to buy the QMod V23 modem has created an entrepreneurial opportunity for Spectre Communications. Take one QMod, attach a Rom-based Spectre Comms pack for the Spectrum and you've got a neat setup that will operate at 1200/1200/75 and 300/300 (sort of) for under £100. Spectrum owners are of course liable to be a bit perplexed when they unpack the kit and find the packaging's got "QL" written all over it, but no matter.

The comms package is available separately, but is designed to match the QMod, the complete kit consisting of two black boxes that stack together at the rear of the machine. Plug in the comms pack, fit the QMod onto the expansion bus on top of it, switch on and you're ready to roll.

The Rom software cuts in immediately on power up, and presents you with an options menu allowing you to log on or off, go into viewdata terminal mode, save, view or print frames (on a ZX Printer), download software, edit messages and frames or go into scrolling bulletin board mode.

The main options menu will either execute the function directly, or will move into a sub-menu presenting other options, log on/off, for example, being split into auto log on, manual log on and log off. If you choose either of the first two you part company with the user friendly menu system at this point, as the procedures are the same, and you're simply presented with the query "Identity?" Reference to the manual, however, reveals that auto log on is for use with Prestel systems, where identity and password can be entered prior to logging on. This stores the identity and password string in memory, while manual log on is the same, except that it doesn't.

This is one instance where the menus, although nearly user-friendly enough for you to be able to do without a manual, fall down. There's also a problem here with the comms pack itself, which has two switches; a line switch and a mode switch, but as neither is labelled, and the manual fails to tell you which is which, it's possible some users will be confused.

Even new users should be able to work it out with a bit of thought, but a couple of sticky labels wouldn't go amiss here, and a couple of extra lines in the software indicating which switch is which would also be helpful. For the record, the line switch is the one on the right, while the left hand one, the mode switch, takes you between 1200/1200 and 1200/75. The latter is

accessed by pushing the mode switch in, and the former by 'out'. Actually getting onto a system is easy, though again it could be a little more obvious. The Spectre doesn't support auto-dial, so with the line switch out you phone the system then push it in when you get a carrier. You're then effectively into the system.

The Spectre seemed to log onto Prestel easily enough, and although I initially had trouble with Telecom Gold at 1200/75 and 1200/1200 this seemed to be related to the speed with which the software reacted to a carrier (Gold drops you very quickly if it thinks you're wasting its time) and - possibly - line noise, the local phone system not being all it might be.

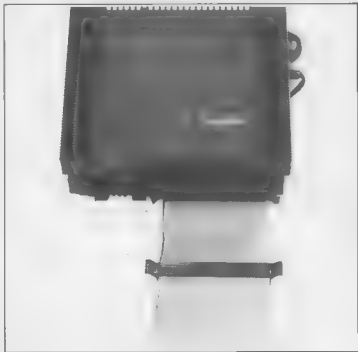
Storage and printing of frames are among the bells and whistles. Frames can be stored on tape or Microdrive, or can be placed in memory, while although printing is normally on a ZX Printer the manual does tell you which line to modify if you want to use a different printer. In addition to this there's a downloading menu, and offline editing for messages. Bulletin board access is catered for at 1200/75 and 1200/1200, but 300/300 can be produced by

a simply wiring job on a cable to Spectre's built-in RS232 port (Sinclair Interface 1 standard), and by using an external V21 or V23 modem. The scrolling terminal menu controls bulletin board protocols, and can be used to alter word length, parity, stop bits, echo and line feed.

From the Spectrum owner's point of view I'd say the Spectre package is decidedly A Good Thing. It's got a certain amount of flexibility to it in that you aren't tied to owning a dedicated Prestel machine, yet it's simple enough to use for it to be attractive to people new to communications. It would have been nice to have 300/300 built in, and nice to have just a shade more nousemaiding from the software, but overall I'd say it was a good buy.

John Lettice

Product Spectre Communications pack
Micro Spectrum 48/128K Price £84 Supplier Spectre Communications, The Old School House, Tenter Row, Crosby Ravensworth, Penrith, Cumbria CA10 3JA (0931 5382).



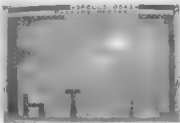
Do-it-yourself games

It's a while since we've seen one of these on the Spectrum; the games writing package to let the non-programmer write his or her own masterpiece of arcade action. Sure there are packages like *Laser Basic* which make it easier to emulate Denton Designs, but this is aimed at the complete klutz end of the market.

With two tapes and an instruction manual, it's a well packed package. First up is a graphics designing kit, which works well. You can create and animate smallish sprites, and a similar grid lets you design UDGs for the scenery in front of which life or death battles will be fought. With mirror, rotate and inverse instructions, plus on screen prompts for filling and testing, even I found these easy to use.

Rather less satisfactory is the sound facility. Not that it's complex but it's rather a matter of trial and error to arrive at that satisfyingly rude rasp you've always been listening for. There's also the opportunity to design the screens, and you're given a warning if they begin to eat up too much memory. Clearly careful planning will be necessary if you're to make the best of this facility, and don't expect to come up with a landscape as attractive as *Fairlight*!

The sprite designer allows you to create your game characters for later animation.



The demo game, *Apple Picking*, shows you what is - and isn't - possible.

Save your data once you've completed the Leonardo stage - and how good to see a verify facility - then turn over the tape and what's this? A demo game lurks on side two and as you play a horrible realisation dawns. Once you've created all those unique UDGs and sparkling sprites, there's damn all you can do with them!

The instructions *don't* make it clear that before you create the game with tape two, side one, you need to initialise a

blank tape from tape two, side two - one of the two serious omissions that I noticed. You then specify which sprites will be used where; how points will be scored and the nature of time bonuses; and the directions of the nasties that you'll be unleashing on the unwitting player.

But the big decision is what type of game you're creating. Ultimate style 3D? Mel Croucher conceptual? Elite epic? Think again. The choice

is pure and simply shoot 'em up vs platforms and ladders. Or to put it another way, *Invaders* with trills or *Manic Miner* without Willy; the games you grumble about, even if they only cost £1.99!

You can mix the two types within any one game but then another horrible realisation dawns. There is no facility for automatically moving to the next screen once you've completed one; it's all done by pressing 'E' (the other thing the instructions neglect to mention).

This does make serious game writing near impossible.

In the long run you'll need to ask yourself why you want such a package. If it's merely for a bit of fun and the creation isn't the thing, then *Arcade Creator* is simple to use and does what it aims to do. But if you want to write games that anyone would want to play, this is just not enough. You'd do better spending some time actually learning to program your Spectrum.

John Misaon

Program Arcade Creator
Micro Spectrum 48K Price
£14.95 Supplier Argus Software Group, Liberty House, 222 Regent Street, London W1R 7DB.

Kissed from Microdeal, is not, as the title would suggest, the latest in tacky games, but a very comprehensive machine code debugger.

What's on offer then is full screen editing, five multiple pass breakpoints, tracing and executive options, a disassembler and mini-assembler, memory block manipulation commands, completely isolated screens from target, relocation of program, keyboard escape and a dump to printer option.

Kissed itself occupies only 12.5K, however the memory used can be as much as 45.25K depending on the size of the isolated window required. Also, the program can be used with either mono or colour monitors/TV's as there are

separate versions supplied on the disc.

The accompanying manual starts well enough but rapidly acquires the clarity normally reserved for printer documentation. An inexperienced programmer will find the latter sections all but impenetrable, but then is, what Microdeal calls, 'the ultimate debugger' aimed at anyone but the experienced machine code user?

The main functions of the program are the memory and register dumps, all of which can be altered easily, and the

disassembler. An interesting extra feature is the ability to 'patch' single-lines of assembler onto the disassembler to cover bugs or things forgotten. Inserting code larger than the space you wish to enter it in will result in the code next to it being overwritten, so care must be taken when doing this.

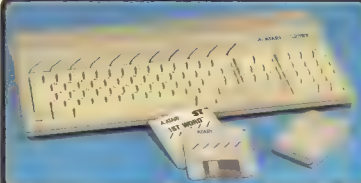
Blocks of memory may be moved, filled with specified characters, verified or have search and replace actions carried out on them. This feature can be quite useful, if not immediately so.

Using the execution options the target program can be run, with checking on various system pointers. However, care needs to be taken to avoid crashing the system on return to TOS.

If this is the sort of package you've been after, look, despite the dire manual, no further.

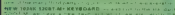
Duncan Evans

Program Kissed Micro Atari
ST Price £29.95 Supplier
Microdeal, Box 68, St Austell, Cornwall PL25 4YB.



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|--|---|

Bouncy Reflective (Reflex) Action

Spherical objects. They're getting everywhere nowadays and it's time decent minded people put a stop to it I say. What started with *Marble Madness* and *Boulder* has continued with *Bobby Bearing* – and now *Action Reflex*. Where will it end? Well, in this case, the list ends with an altogether above average arcade game.

With a name like *Action Reflex* you'd expect to be ducking and diving, dodging and weaving amongst the alien hordes, blasting away like there was no tomorrow. Not so, as this one requires quickness of thought in addition to some pretty nifty joystick skills.

The general idea is to guide your bouncing ball (an escapee from an Amiga demo I would guess) through screens against time – but whereas

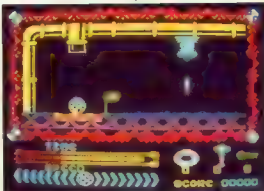
Boulder had you bounce onto objects, in *Action Reflex* you must bounce over them; contact with some meaning instant death (you get resurrected but lose valuable time), others simply get in the way.

All this is done against time in simple, but effective 2-D graphics – the object being to complete the maze of screens within a certain period and to collect bonus points which will help you on your way.

Controls are easy – left/right and fire to control the height of bounce.

A few minutes play shows the thought that has obviously gone into the design. To overcome some obstacles, you must bounce from another screen while others require careful positioning.

This is a game more of strategy than reflex, but if you're



in the market for an imaginative, original arcade title, *Action Reflex* is in with a shout.

Despite the hackneyed subject matter, you might still have a ball.

John Cook

Program Action Reflex Micro Spectrum Price £7.45
Supplier Mirrorsoft, Purnell Book Centre, Paulston, Bristol BS16 5LQ.



As game titles go, something like *Summer Games* or *Winter Games*, is reasonably self-explanatory. But *Knight Games*? All becomes clearer and thoroughly more logical when you realise that what we have here is a game involving things medieval.

Think of a cross between *Expanding Fist* and *Summer Games* (Fifteenth Century style) and you won't be going far wrong.

Knight Games is a multi-loader, consisting of six combat games (Swordfight 1 and 2, Quarterstaff, Ball & Chain, Pike Staff and Axeman) and two 'hit the moving target' games (Crossbow and Archery). Before that word multi-load has you running for the Valium, you'll be pleased to know that the average waiting time is about two minutes.

The major hallmarks of all the events, however, are the

Fun For Every Knight

superb graphics and sound. These are some of the most brash and colourful screens you have ever seen on a 64 with some excellent original sound effects and music (with suitable heraldic overtones). No complaints in this department, square – but how do the events play in themselves?

There's no denying that despite the differences in weapons, many of the combat events play in very similar fashions. Controls are the same for each – with defensive moves on the joystick diagonals and attack using the verticals/horizontals – a total of eight, not including movement left and right.

With the exception of Quarterstaff – despite the animation being changed each event – the overall feel is not radically different. Despite this, there's no denying that there is still a great deal of enjoyment to be had – particularly in two player mode.

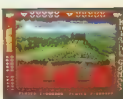
Hack, clang, hack – not much

subtlety here maybe – but it's great fun nevertheless, and it's certainly fast and furious.

The 'target' events are a simple hand-eye co-ordination, with the added spice of an unsteady cursor (with which you aim your shot) and the fact that you're competing against time.

Knight Games may not be the most challenging combat/sports type programs. What it is, is a game that will charm you with its colour and atmosphere. Combine this with a playability which will entertain without stretching any mental ability and you have a hit that will particularly appeal to the younger player.

John Cook



Masterful

If Mastertronic keeps this up, the other budget labels might as well quit now. *Speed King*, the latest, is a winner all the way with fine graphics and sound effects, and non-stop action.

Yes, I know there've been racing simulations before but this one is so well done it deserves a place in the cassette player of every C64 and 128 owners.

At two quid it's an offer you can hardly refuse, and the exe-

Program Knight Games Micro
Amstrad Price £8.95 (tape)
£14.95 (disc) CBM £8.95 (tape)
£12.95 (disc) Supplier English Software, 1 North Parade, Parsonage Gardens, Manchester, M60 1BX.

cution is so good I'd pick **over** *Revs*, *Pole Position* **al.**

Speed King is a motorbike simulator, and the animation is great. As you take the corners, your rider leans into the bend, dropping his head to watch the road. Open the throttle as you come through and he slides back into position.

You'll find yourself leaning in your chair through the esses.

Blackstar Classic

You can't keep a good man down" is a rather old saying. Well in this case it should. "You can't keep a good game down" and it aptly applies to *Blackstar*. Originally released by SCR for the Spectrum, this adventure has seen more labels than a can of beans. However, in saying that, *Blackstar* or *Castle Blackstar* as it was first known, still ranks as one of my old time favourites.

The objects of the game is to find a mystical Orb and return it to the Fair Lady Artemis. Your explorations begin above ground and gradually move into the Castle where all sorts of devious problems, gloomy locations and astounding events await you before tackling the locations below the Castle.

The descriptions in this text-only adventure are long and satisfying, building up a world where anything is likely to happen, and invariably does, but the programmers have had the good sense to include a Ram-saver and my advice is to use it regularly (programmers please note).

Before this particular quest over you will have encountered such notable characters as 'The Hydra' who is rather spartan to ginger-bread, a wicked witch - "anybody fancy a flying broomstick", and the proverbial Dwarves, (well I mean, what adventure is complete without a Dwarf or two).

■ Garrett

Program: Blackstar Micro
Amstrad CP6128/PCW8256
Price £7.99 Supplier CRL
Group Ltd, CRL House, 9
Kings Yard, Carpenter's
Road, London E15.

There's a host of options too. Ten circuits including Brands Hatch and Silverstone, three skills levels, practice laps, and races against 19 kamikaze opponents who give no quarter on the track. You can vary the number of laps per race too.

One nice feature is that the game records lap and race times for every combination of track and race-length, so you can play against friends or challenge for your own personal records.

Speed King is little short of

brilliant.

Peter Worlock

Program: Speed King Micro
Commodore 64/128 Price
£1.99 Supplier Mastertronic,
8-10 Paul Street, London
W1R 7DB.

Floyd the Funny Droid

I must admit that opinion is divided, but I for one would defend *Floyd the Droid* just on the grounds of its title, even were it not an original and visually engaging romp.

This Dutch import features a sewer-cleaning robot - none of the glamour of interstellar warfare here. Your task is to pre-program the droid to deal with the rats, bats, lizards and assorted nasties lurking in the sewers, then guide him around the network cleaning it out.

As you cruise the sewers, the cleverly animated droid shouts 'BOO!' at your command to flush out the vermin (good speech synthesis here). Having smelled a rat, your viewpoint switches from the usual 45 degree perspective to a side-on view. You must now choose the appropriate sequence of actions - jumping, shooting, running forward, and so on - to exterminate the vermin. You can either do all this with the joystick, or pre-program a sequence in the Procedures screen. It's not possible to pre-program a procedure to

deal with the rogue droids which sometimes attack you; you have to fight them manually.

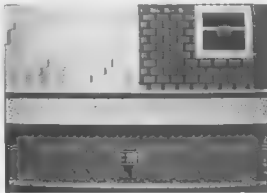
The aim of the game is to clean out the sewer system as quickly as possible, while sustaining as little damage as possible and covering the ground efficiently.

Floyd the Droid has lots of good points, not least nice graphics, light-hearted sonics

and very original game play. The office sceptics would point out, though, that it's frustratingly slow to play - a major drawback - what could otherwise have been an excellent title.

Chris Jenkins

Program: Floyd the Droid Micro
C88 64 Price £9.95 Supplier Ariolasoft, 68 Long
Acre, Covent Garden, London
WC2.



About as fun as Earwig Racing

Picture this: Scott: Mah bonny wee engines captain - they can't take it (Cut to Scott, pieces of plywood and polystyrene falling around him. Screen shudders.)

Engine: Wheeoeinggg... blurr. (Silence. Extras pick themselves up off floor nursing bruises.)

Scott: It's no good captain, she's lost all power...

The theory, I suppose, is fine if the BBC can whang out interminable repeats of out-moded space operas, and still having people in their thousands eating them off a stick, it should also be possible to make a killing by chucking out

Basic programs with laughable graphics, dodgy routines and a space hook. Hello Bug-Byte, hello *Star Force Seven*.

I'm a sucker for management games, and bearing in mind the fact that many of the all time greats are humorous on a par with *Star Force Seven* I braved the howls of derision from the rest of the office and gave the game every chance. It's basically (Basic-ally?) text, with a couple of unimpressive graphics thrown in, and the script goes something like 'Take this battle fleet and cruise around the galaxy beating hell out of the Thuggoid empire.'

To do this you orbit a planet.

bombard it (gronk gronk, said the guns), then assault it from the air, then on the ground. Once you've done this you replenish your forces, then it's off to the next exciting planetary attack. As an intellectual challenge it's just north of earwig racing. There's another bit that covers space combat, but that's boring too. No. No. No.

John Lettice

Program: Star Force Seven Micro
BBC B/Electron Price
£1.99 Supplier Bug Byte,
Liberty (Huh!) House, 222
Regent Street, London W1R
7DB.

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The Trilogy completed

Tony Kendle with the last Knight-Tyme story

Well deserved acclaim is being received by the new David Jones budget masterpiece *Knight Tyme* which has appeared first for the 128K Spectrum. For those who really don't know, *Knight Tyme* is the third in a Mastertronic series that began with *Finders Keepers* and *Spellbound*.

Each of the games were extraordinary value when released (very cheap yet of comparable quality to full price games), but they have been eclipsed by the latest which is being made available for the current range 128K machines, using the extra memory, at the amazing price of £2.00. The graphics are of excellent quality, the popular Windowation menu system has been retained but there are more rooms and more devious puzzles. A slimmed down version of the game will be out for most 48-64K computers as well.

In his last letter to the column David promised some tips on *Knight Tyme* after the game had hit the shops but before we get on with them, David has the good news that the game should be available for the Amstrad CPC range and MSX by the time you read this - also *Spellbound* is being converted for MSX and Atari.

He also writes "since reading the comments of Eric Ellis about the similarity between the *Spellbound* puzzles and Agatha Christie books I have taken to reading them rather than my usual literary diet of SF and more SF. Agatha Christie has given me a few interesting ideas for future games." Eric Ellis, what have you done? Future games players of the world may curse you for putting new ideas into an already fiendish head. Anyway, let's get on.

"I have not overdone the clues because the game is so new - but I will send more later if anyone needs more help.

"Before you can use the Transporter you must mend it, you must also have some valid Transporter Coordinates to enter into it and be standing on the Transporter Pad.

"To fix the Transporter you move the Starship to Starbase 1 (via Polaris) and Communicate to Request Overhaul Starship. The Transporter will be fixed by the Overhaul Crew. In the 48K version request Gordon to help and he will re-route the control circuits under the guidance of the Overhaul Transporter on Starbase 1.

"If you then request help using the Communicate command when at Starbase 1

you will see some Transporter Coordinates to use. Note that you can't beam down to every planet you come across and that you can only beam down to the one you are orbiting at the time due to the distance limitations ■ the Transporter Beam. Also, the Advert is useful in the game."

David continues, "Take care not to run out of fuel. Certain planetary locations will supply you with a full tank, others may still ■ waiting for their fuel delivery and others may just not want you to help them anyway."

"For working out your planetary destinations you will need to construct a map ■ the game. The following start will apply to the 128K version only. The planets are laid out on an 8 x 8 grid. Not all of the 64 locations have planets in them and you can only move to stars that are 'next door' to the one that you are at.

"To start the mapping here are the positions of some of the stars that you start near. It is useful to move ■ Starbase 1 fairly early in the game. Some other useful destinations include Reel, Herschell, Bingo, Plinkit, Monopole and Outpost.

| | | |
|------------|---------|------------|
| Deneb | Gath | Lengraad |
| Limbo | Eden | Empty |
| Brightstar | Polaris | Starbase 1 |
| Hestia | Empty | Empty |

"Deneb is the star in the top left hand corner of the entire map."

That's all of the tips but there is one more important thing. Regular readers will remember the challenge set for hackers of *Finders Keepers*. David had ■ special cheat routine that could be set into operation using ■ secret poke. Well ■ similar system has been implemented on *Knight Tyme* that will give you access to any room or any planet. This routine can be accessed by poking a single byte somewhere ■ the game but we're not going to tell you what it is as it is going to form the basis of a competition for hackers.

The first three people who send in the correct poke, which is the same in both the 48 and 128K version, will win a special Magic Knight T-Shirt which David has had printed, so ■ you think you have cracked it remember to say in the letter whether you are small, medium or large.

A change of subject now to look at another excellent follow up. Alien Highway

from Vortex. Andy Woods of Andover writes to say that he has completed ■ without pokes.

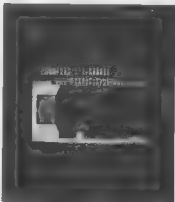
"In case there are any non-believers you push the Terratron through four pillars and it goes under computer control. Then it moves forward to a little square and the Vortron and Terratron join up to form ■ sort of wheelless tank. This moves forward to ■ large complex and fires ■ couple of rounds - the screen goes white, makes ■ noise and you are left looking ■ the base upon which the complex stood. Then comes ■ completion message and a warning that next time it will be harder (big wow!)."

Andy has some tips for the game - but first, for some strange reason he insists on publicly declaring his everlasting passion for a certain young lady.

To save them both considerable personal embarrassment and due to the fact that, most likely, this would ■ an episode that both parties would regret in years to come, Tracey Sutherley will have to remain anonymous. Sorry about that, Andy.

Anyway, "it is best to move up the left hand side of the highway. Leave the Terratron near the start, solve about 10 screens ■ puzzles and kill all aliens, then return for it. Before entering a screen always fire a few shots.

If behind the Terratron you can turn 45 degrees outwards and fire so no kamikaze aliens will get you. To get through the two cat-gas symbol-type pillars line up the vertical line on the vortex with the line that runs through the pillars - and that's it!" Indeed it is.





Graphic Amstrad Adventures

Tony Kendle creates with the Quill

Amstrad adventure-writers have had the benefit of Incentive's *Graphic Adventure Creator* for some while now, and one or two programs are beginning to filter through from this source. They are of varying quality, as regular readers will now know, but I'm sure that what is, at the moment, a trickle, will eventually become a *Quill*-like torrent.

Incentive's new series, *Medallion Adventures*, will feature GAC'd programs, and they would be very interested in seeing your creation with a view to publishing it (and Incentive's marketing power means that your adventure is going to be seen by a lot of people). In the Spectrum field, Gilsott's *Quill* has held a monopoly for adventure-writing utilities, a monopoly that is challenged by Incentive. The Spectrum version of GAC is now released, and I am sure that it will prove a viable alternative to *The Quill*.

The new version is much the same as the Amstrad program, with the addition of, in the graphic mode, screen co-ordinates to help you find your way around. I haven't got room here to go into great detail about the utility, and you can refer back to *Popular*, Volume 4, No 51 (the Christmas '85 issue) for a close look at GAC. All the comments I made then hold true for the Spectrum release. Suffice to say that you'll probably find the utility easier, friendlier to use than *The Quill*, though possibly rather more limiting in terms of layout and so on.

The graphics-creating section of the program is capable of great results, and with a certain amount of fore thought, some stunning games are possible. However, as we've found with *The Quill*, the utility must be used with care in order to avoid that conveyor belt, mass-produced look, the vast majority of *Quill*d adventures show a sad lack of imagination. After all, these utilities make it an easy task to write any adventure, but not necessarily a good one.

Since the first appearance of the basic *Quill*, two extensions of the program have been released - *The Illustrator*, adding the facility for graphic illustrations to the plain text, and *The Patch*, which added certain much-needed embellishments, such as sound-effects and RAMsave. Phil Wade is the author of *The Patch* and writes to say, "Many of *The Patch*'s features were inspired by comments in your articles; certainly the RAMsave facility was a direct result of your comment that very few

adventures seemed to offer this facility. I'm not a professional programmer, and I'm not a whizz-kid either, having reached the incredible age of 38 (so young, so young!). I must be one of the minority of readers who can understand what *Beatie Quest* (Patch'd) is all about!

"I've just finished *The Expander*, which is for text-only *Quill*d adventures. It allows the writer to use the 7K of bytes otherwise 'wasted', which represents a 25% increase in space. The utility will not go on sale though until I've finished two other programs to go with it, one of which is the opposite of *The Expander* (geddit?) and will be used with Patch'd programs. *The Patch* has probably been responsible for a renewal of interest in *The Quill*, and any update in the utility must be a good thing. More news as it arrives.

"The Quill requires plenty of imagination"

Gerald Kellet has also authored an add-on to *The Quill* (the C series), which adds five extra actions to the utility. "PARSE extends input interpretation, up to 15 words at a time from a single line of input. WAIT effects a passage of time by cycling through the Status table and Turn flags update, ADD and SUB work on two flags instead of a flag and a fixed value, and PERFORM calls entries in the Event table as if they had been input by the player - this is primarily for 'forced syndromes' (Event equivalents), and also for loops, shared routines, ORed and XORed logic. I am at present endeavouring to get this published." If you want to know more about this interesting looking add-on, contact Gerald at Queen's Street, Stamford, Lincs PE9 1QS.

But, as regular readers of *The Corner* will be aware, there are several other adventure-writing utilities available for the Spectrum apart from *The Quill*, most of which have been seen in this *Corner*; joining these now is *The Spectrum Adventure Builder System* from Tartan Software. Tom Frost is the author of this utility, and his name should be familiar as the Adventurer of 1985, a title bestowed upon him by Incentive Software for being the first to solve the Ket Trilogy. As the creator of a couple of adventures, Tom has decided to

pass along his expertise to us lazier mortals in the form of this adventure-writing utility. Where *The Quill* hands everything to the user, requiring only (!) plenty of imagination and lots of pre-planning, Tom's SABS demands some programming expertise of the writer. Not a lot, but as a reward the program is very flexible (and stunning value, I might add).

Essentially, some Basic in the form of short loaders must be written, but all the hard work of Data statements and variables is taken care of by SABS. On-screen prompts ask for the number of verbs and the maximum length, how many objects and the maximum length of their names, number locations, number of objects carried and so on and so on. The standard responses such as "Here you can see" and other system messages can be changed at will, as can the screen layout and colours.

The Code Generator program then assembles all the data; another module passes the finished dataset to the machine-code which will run the adventure. This is what makes the utility very interesting - as you can see from the game that Tom has written using SABS, responses are as quick as with *Quill*d adventures. *Spy Trilogy* is a three-parter displaying all the features available to users of SABS, such as RAMsave, split-screen scrolling and so on. The *Trilogy* is worth looking at on its own merits, with the first two parts being a beginner's introduction to the final, more difficult part.

Graphics play a part in this game, and Tartan Software offer a *Graphics Aid* module, which will allow the user to build up a re-designed character set to use in pictures. This, together with the main utility, is all the adventure-writer needs to write professional-looking programs which should stand up to *Quill*d games. And the suite of programs is great value of £4.50 for the main SABS module, £2.85 for the graphics module (you'll only be able to use it with SABS), and these are available together at £6.50.

Spy Trilogy, which I'd recommend as an excellent example of the utility's power, and as a great adventure, is just £2.50; these prices represent fantastic value. All available mail order from Tartan Software 61 Baile Norrie Crescent Montrose Angus Scotland DD10 8DT or from the software catalogue of The Adventurer's Club Ltd.

Future programming for your micro

John Mawhood explains micro-Prolog

So often you hear people say that they bought their micro only to find that, when it comes to programming, the languages available for their machine do not really offer any useful scope. This may be because the language is difficult to produce good programs in quickly or because the version of the language they have is limited.

Anyone who owns one of the range of micros which run CP/M 2.2 or CP/M Plus software really can begin to use professional quality languages from the word go. At the moment a lot of this is only available ■ a hefty price – sometimes costing as much as the computer itself. But not all micro-Prolog, although not exactly cheap, compares well with the price ■ packages for Pascal or C.

If you own a Spectrum or BBC machine you can get, for even less, "native" versions of micro-Prolog, which can produce graphics as well as having most ■ the features of standard micro-Prolog.

Prolog was developed on mainframes and is the language the Japanese have adopted for their "fifth generation" computer project, aimed at the development of artificial intelligence and other wonders. Micro-Prolog is the version of the language for micros.

Every computer "buff" has their favourite language. Generally you will find it's a question of horses for courses – ■ get stunning graphics you would not usually choose BASIC. (Before hardened BASIC games authors write in. I am not saying you cannot do it) But surely, if Prolog ■ being used to develop so-called artificial intelligence, it must be a pretty powerful language? Perhaps a language you could benefit from trying out?

A word of warning: once you have used micro-Prolog you may never be able to go back to your old language. ■ you have only used BASIC or PASCAL, at first you will find micro-Prolog ■ bit strange. This ■ because it is a declarative language not iterative.

I do not have space here to explain the reasons but ■ is generally accepted that "structured" languages which can ■ programmed top-down are most useful, and produce better programs (and programmers). Structured languages help to prevent "spaghetti" programs – where you cannot see how ■ all works. Another limitation with languages ■ the way ■ which information (called "data") is stored.

Micro-Prolog gives the programmer perhaps the most structured language one could hope to have on a micro today as well as the most flexibility with data, because data and programs are all the same thing in micro-Prolog. More than this, it offers "metallogical" programming fea-

tures available with few other languages. Metallogical programming involves writing programs that manipulate other programs or even themselves.

The power of micro-Prolog lies ■ the logical way it works – Prolog stands for PROGRAMming in LOGic. It is possible to create programs at the keyboard. You can start by writing a description of the whole problem you want to solve and then write the descriptions of all the stages which make up the problem working from the top down (true top-down programming). With other languages you have to do all that on paper first and then actually write the program from the bottom up. But in micro-Prolog it is possible to run a half-written program. When it comes to a part that is not written you have, if you use the trace facility that comes with micro-Prolog, the option of writing it and carrying on where it stopped – PASCAL or BASIC would treat that as an error.

```
{(apply_user_defined_operation
first_list second_list result_list)
(empty_list first_list)
(empty_list second_list)
(apply_user_defined_operation
first_list second_list result_list)
(split_first_list_head_of_first
rest_of_first)
(split_first_list_head_of_first
rest_of_second)
(split_first_list_head_of_first
rest_of_second_result)
(put_on_end_result_result
list_new_result_list)
(apply_user_defined_operation
rest_of_first_rest_of
second_new_result_list)}
```

The micro-Prolog ■ the box is the only program you would ever need to apply any

two-argument operation to two lists. Which could be lists of numbers or other constants (and that includes operations you have defined yourself, not just mathematical or boolean ones). This is possible because of the metallogical feature. In BASIC or PASCAL you could copy the routine each time and put in the operator you wanted, but it could not be used with a user-defined operation.

A micro-Prolog program is ■ list of words enclosed in brackets. The structure of each "list" is as shown below, with square brackets indicating optional parts and underlining indicating parts you cannot leave out:

```
((program name first parameter
[any number of following
parameters]) [any number of
calls to sub-programs by
name followed by the appropriate
number of parameters –
each call enclosed in
brackets])
```

How does micro-Prolog execute these programs? Think of the program as describing the layout of a cluster of "rooms" in an adventure game. Remember that each cluster of rooms can have corridors (i.e. make a call to) other clusters. Micro-Prolog is the adventurer and the goal is to reach the end of the "list".

The "parameters" which you give micro-Prolog when you start it are like keys or tokens, which it uses ■ pass through the rooms. It can find more keys of tokens as it works its way along. With the right keys, micro-Prolog will eventually work its way through all the rooms in the cluster reach the goal.

Some rooms contain tasks for micro-Prolog to perform before it can pass on to the next room. Some may ■ a corridor to another cluster. Micro-Prolog has to go down any corridor ■ comes to and work through the rooms at the end because

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there may be tokens in them: it needs ■ achieve its goal. Once all the rooms at the end of a corridor have been "done" micro-Prolog goes back and carries on in the main program.

If micro-Prolog fails to perform a task in any room ■ has to backtrack to see if there were any alternative tokens it could have picked up earlier. This can happen if you have written two or more versions of the same sub-program. Micro-Prolog has to try them one at a time until it finds the right tokens to enable it to perform the task it had failed on.

Ultimately if a task cannot ■ performed after micro-Prolog has tried all the alternative sub-programs then it gives up altogether. It shows its frustration (and tells you it has failed) by printing "???" on the screen.

You may think that this is a far cry from BASIC where the computer executes one numbered line of instructions followed by the next, unless your program tells it to do something else. What it means is that micro-Prolog does all the work jumping about between the various parts ■ your program. Nowhere in micro-Prolog can you go to another part of the program — as if it broke through the wall of a room — that would be cheating. The advantage is that

to be a built-in program in micro-Prolog but we could have used a user-defined operation. The result ■ put on the end of the result list.

But I bet you could have read the example and almost guessed that — even not knowing micro-Prolog! The last part of the program seems funny; it looks like we are using "apply" is a recursive program, which means it calls itself. It is a very neat way of getting micro-Prolog to keep doing the same thing over and over again as ■ moves down a list.

You will have noticed that when micro-Prolog comes to "apply" at the end of the second program, we have only given it the part of the lists that has not been added yet — and the list of results so far. Every time round micro-Prolog tries the first program for "apply". Eventually it will find that the first and second lists have no more elements left — the first program ends if that is the case and micro-Prolog succeeds. In this explanation we used a simple operation — addition. But "apply" would work with a program for use by a doctor to tell whether two drugs ■ combination were harmful for a patient.

If you found all that a bit technical do not ■ put off. I had to use an example that would show the power of micro-Prolog.



anyone else can work out what the program does — because all the execution follows the logic of micro-Prolog. It is impossible to write "spaghetti" programs in micro-Prolog. As a result you concentrate on solving the problem. It is not surprising to find that commercial software written using Prolog can be half as long and written in a fraction of the time that it would take a conventional language.

So how does our example program work? Let us say we have two lists (1 2) and (3 4), and we want to add the pairs of numbers together to make a third result list. (Remember micro-Prolog stores data as lists just as it does programs). So in our example "user_defined_operation" will be a + sign and "first_list" will be (1 2) and "second_list" (3 4).

Micro-Prolog will start with the first program for "apply". As it fails to perform the task (empty_list (1 2)) — because (1 2) is not an empty list — it goes back to see if there is an alternative program for "apply", which there is. Using the alternative program micro-Prolog finds it has to take the first element of each list and execute or "apply" (hence the name I used) the operation you have given it, +, to them — holding onto the result. Addition happens

Fortunately beginners in micro-Prolog are extremely well catered for. There are no less than three simplified forms of micro-Prolog that comes on the disc. The easiest ■ use ■ MITSU (Man In The Street interface), the second, SIMPLE, accepts programs in almost-English (SIMPLE is in itself as powerful a relational database language as you could buy) and MICRO is a comprehensive software development tool. To make life even easier you get special programs which let you trace your programs as closely as you like (I used these constantly), and another allows you to use your disc drive as part of your program while it is running — useful because micro-Prolog tends to devour memory.

To complement this there are some excellent books which will take you from knowing nothing to a good understanding ■ micro-Prolog. See the table.

Conclusion

Micro-Prolog is now available on under MSDOS CP/M86 and UNIX operating systems so if you want upward "portability" it is there. Unlike PASCAL, micro-Prolog is an interpreted language which means you can write parts of a program and run them

straight away — as you do ■ BASIC. This, along with the tracing and debugging programs you get makes it easier to use, in my view, than BASIC. There ■ a compiler for the 16 bit version if you think you will need to get professional when the new "cheap" 16 bit machines comes onto the market.

If you are looking for a language that ■ going to help you become familiar with the kind of programming that will be widespread by 1990, have a close look at micro-Prolog, it is excellent value for money. Although ■ is not very good for graphics, it is good for your programming.

Micro-Prolog Buyers Guide

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Amstrad CP/M Price £89.50 + VAT
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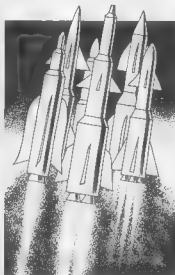
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Spectrum Price £24.95 **Supplier Sinclair**
Research, Milton Hall, Cambridge.



DODGEM WITCHES

by Derrick Reid

Can you face up to the task? You must steer your spaceship clear of the manic witches that fly in mad confusion through the sky.

This principal purpose of this routine however, is not to provide a simple game but to provide the programmer with a machine code sprite movement utility enabling all eight sprites to be moved around the screen with ease. I have placed the routine at the end of the listing to make the task of incorporating it into your own programs easier.

The routine forms lines 60000 onwards and should be initialised by *Gosub 60000*

after all the data for the Basic program has been read in.
Sprite movement is controlled by one Sys command:-

Sys 49152.No.XV,YV,XD,YD

where N_0 = number of sprite (0 to 7)

XV = horizontal velocity (0 to 255)

YV= vertical velocity (0 to 255).

x_D = vertical displacement (-128 to

1275

YD = vertical displacement (-128 to

1275

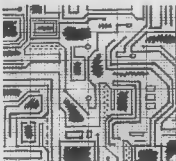
In the sample game a joystick in port 2 controls your spaceship.

[illegible]

Programming: QL

[illegible]

Programming: Amstrad



DEBUGGIN' by T A Bartley

This is a grid game where your hero has to neutralise all the magnetic cores in an ancient computer system. However, the logic bombers have other ideas and they try to put the bite on you by sending logic bombs along the data lines.

Every time you complete a screen your score is added to the total so far, followed by a bonus screen which doesn't have to

be completed to score points. There are eleven screens, each followed by a bonus screen, making a grand total of 22. Speed is selected from a range of one to five, the faster speeds being worth more points but, of course, making the game harder.

You can use either the cursor keys or a joystick to control your buggy and, during the game, you can pause by pressing 'H'. Restart by pressing the space bar.

Programming: Amstrad

Program 1 is the Basic loader for the machine code, when it's finally typed in. Type in the loader and save it under the file name "Debuggin". Program II is the decimal loader for entering the actual machine code and should be typed in and

then run

Now, the data, all 3896 bytes of it, should be carefully entered. However, because of the large amount of data to be entered this being split over two weeks. Use the command `Save "Debugcode",8,31000,2048`

The checksum for the first block of data is 166943. More next week.

If you can't face the prospect of all that typing then send £2.00 to me at 81 Beverley Crescent, Grimsby, S. Humberside DN32 9TJ.

| | | | | | | | | | | |
|--------|-----|-----|-----|-----|-----|-----|-----|-----|------------------|------|
| 213900 | 0 | 16 | 32 | 0 | 0 | 16 | 32 | 0 | 0 | 96 |
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| 214040 | 16 | 32 | 16 | 32 | 0 | 32 | 16 | 0 | 0 | 144 |
| 214060 | 16 | 48 | 48 | 32 | 0 | 48 | 48 | 0 | 0 | 240 |
| 214070 | 0 | 0 | 0 | 0 | 0 | 16 | 32 | 0 | 0 | 96 |
| 214080 | 48 | 0 | 0 | 0 | 16 | 32 | 32 | 0 | 32 | 320 |
| 214270 | 48 | 48 | 48 | 0 | 0 | 0 | 48 | 48 | 0 | 240 |
| 215000 | 0 | 8 | 40 | 40 | 48 | 48 | 0 | 0 | 0 | 240 |
| 215080 | 16 | 32 | 32 | 0 | 48 | 0 | 0 | 0 | 0 | 120 |
| 215090 | 0 | 0 | 0 | 40 | 0 | 16 | 16 | 32 | 0 | 96 |
| 215100 | 0 | 48 | 48 | 48 | 48 | 48 | 0 | 0 | 0 | 240 |
| 215110 | 48 | 0 | 0 | 0 | 0 | 48 | 48 | 48 | 0 | 240 |
| 215120 | 158 | 0 | 16 | 32 | 0 | 0 | 0 | 0 | 0 | 112 |
| 215130 | 0 | 252 | 252 | 168 | 0 | 168 | 0 | 168 | 0 | 1120 |
| 215140 | 0 | 252 | 252 | 0 | 0 | 132 | 72 | 0 | 0 | 780 |
| 215150 | 0 | 64 | 128 | 0 | 0 | 64 | 128 | 0 | 0 | 384 |
| 215160 | 0 | 64 | 128 | 0 | 0 | 64 | 128 | 0 | 0 | 384 |
| 215180 | 0 | 122 | 72 | 0 | 0 | 252 | 252 | 0 | 0 | 780 |
| 215190 | 0 | 168 | 84 | 168 | 84 | 252 | 252 | 168 | 0 | 1260 |
| 215200 | 252 | 192 | 252 | 168 | 144 | 128 | 84 | 0 | 0 | 1200 |
| 215210 | 252 | 84 | 0 | 0 | 0 | 252 | 0 | 0 | 0 | 560 |
| 215220 | 0 | 212 | 252 | 192 | 192 | 92 | 64 | 192 | 0 | 1152 |
| 215230 | 192 | 92 | 0 | 0 | 0 | 212 | 252 | 192 | 0 | 1152 |
| 215240 | 0 | 0 | 252 | 168 | 0 | 0 | 0 | 252 | ¹ 672 | 672 |
| 215250 | 0 | 3 | 1 | 2 | 0 | 3 | 1 | 2 | 0 | 12 |
| 215260 | 1 | 0 | 0 | 0 | 3 | 1 | 0 | 3 | 1 | 12 |
| 215270 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 215280 | 0 | 2 | 0 | 0 | 0 | 1 | 3 | 0 | 0 | 6 |
| 215290 | 0 | 1 | 3 | 0 | 0 | 1 | 3 | 0 | 0 | 6 |
| 215300 | 1 | 3 | 0 | 2 | 0 | 1 | 1 | 0 | 0 | 12 |
| 215310 | 0 | 3 | 1 | 2 | 0 | 3 | 1 | 2 | 0 | 12 |
| 215320 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 0 | 6 |
| 215330 | 2 | 3 | 0 | 3 | 0 | 1 | 3 | 0 | 0 | 18 |
| 215340 | 0 | 2 | 3 | 2 | 3 | 0 | 0 | 0 | 0 | 15 |
| 215350 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 215360 | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 7 |
| 215370 | 1 | 3 | 3 | 3 | 3 | 3 | 2 | 0 | 0 | 18 |
| 215380 | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 0 | 0 | 15 |
| 215390 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 215400 | 0 | 0 | 128 | 0 | 0 | 128 | 0 | 0 | 0 | 256 |
| 215410 | 0 | 128 | 0 | 0 | 0 | 128 | 0 | 0 | 0 | 256 |
| 215420 | 192 | 192 | 192 | 192 | 0 | 0 | 0 | 0 | 0 | 696 |
| 215430 | 0 | 0 | 128 | 0 | 0 | 0 | 128 | 0 | 0 | 256 |
| 215440 | 0 | 0 | 0 | 0 | 12 | 4 | 0 | 12 | 4 | 24 |
| 215450 | 4 | 12 | 12 | 4 | 0 | 12 | 4 | 0 | 12 | 56 |
| 215460 | 0 | 0 | 12 | 4 | 0 | 9 | 0 | 12 | 4 | 48 |
| 215470 | 4 | 12 | 12 | 12 | 12 | 12 | 12 | 0 | 0 | 72 |
| 215480 | 0 | 0 | 14 | 14 | 14 | 14 | 0 | 0 | 0 | 48 |

```

10 *****
20 '
30 ' PROGRAM 1: BASIC LOADER FOR GAME
40 '
50 ' *****
60 MEMORY 30999
70 INK 0.1:INK 1.24:PAPER 0:BORDER 1:CLS:MODE 3
80 LOCATE 8,10
90 PRINT "DEBUGGIN' by T.A.Bratley"
100 LOCATE 12,14
110 PRINT "Copyright 1986."
120 LOAD "DEBUGCODE",31000
130 CALL 31063
140 *****
150 '
160 ' PROGRAM 2: DECIMAL LOADER
170 '
180 ' *****
190 MODE 2
200 total=0
210 FOR n=31000 TO 33040
220 INPUT i
230 PRINT n,i
240 POKE n,i
250 total:=total+i
260 NEXT n
270 PRINT "Checksum = ",total
280 STOP

```

| | | | | | | | | | |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 31534 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 31524 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 31532 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 31548 | 0 | 1 | 1 | 18 | 19 | 14 | 14 | 14 | 0 |
| 31548 | 14 | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 0 |
| 31556 | 15 | 6 | 26 | 6 | 26 | 6 | 26 | 17 | 128 |
| 31564 | 550 | 123 | 175 | 245 | 26 | 71 | 19 | 26 | 0 |
| 31572 | 79 | 19 | 241 | 245 | 218 | 295 | 58 | 116 | 124 |
| 31578 | 299 | 241 | 68 | 254 | 11 | 175 | 295 | 158 | 0 |
| 31586 | 197 | 62 | 265 | 14 | 186 | 0 | 0 | 0 | 0 |
| 31594 | 58 | 229 | 122 | 63 | 1 | 58 | 224 | 122 | 0 |
| 31702 | 285 | 144 | 173 | 3 | 248 | 192 | 34 | 225 | 156 |
| 31708 | 122 | 1 | 25 | 0 | 17 | 135 | 121 | 30 | 514 |
| 31720 | 4 | 48 | 285 | 172 | 132 | 33 | 129 | 194 | 907 |
| 31736 | 34 | 227 | 120 | 1 | 25 | 0 | 17 | 223 | 649 |
| 31744 | 131 | 30 | 9 | 1 | 285 | 215 | 132 | 30 | 768 |
| 31762 | 112 | 195 | 34 | 225 | 122 | 1 | 27 | 0 | 716 |
| 31768 | 17 | 227 | 131 | 30 | 1 | 285 | 285 | 173 | 0 |
| 31776 | 132 | 33 | 255 | 194 | 34 | 227 | 122 | 1 | 0 |
| 31786 | 30 | 17 | 17 | 38 | 123 | 31 | 16 | 1 | 259 |
| 31794 | 285 | 255 | 152 | 6 | 1 | 62 | 64 | 285 | 0 |
| 31802 | 158 | 92 | 72 | 4 | 62 | 65 | 285 | 0 | 617 |
| 31810 | 38 | 187 | 34 | 2 | 62 | 65 | 285 | 0 | 617 |
| 31818 | 38 | 187 | 34 | 2 | 62 | 65 | 285 | 0 | 617 |
| 31826 | 38 | 187 | 32 | 16 | 4 | 62 | 65 | 285 | 572 |
| 31834 | 38 | 187 | 32 | 16 | 4 | 62 | 65 | 285 | 572 |
| 31842 | 38 | 187 | 48 | 215 | 128 | 58 | 223 | 122 | 957 |
| 31850 | 175 | 30 | 88 | 78 | 17 | 288 | 7 | 227 | 0 |
| 31848 | 67 | 16 | 252 | 34 | 216 | 122 | 30 | 247 | 962 |
| 31856 | 199 | 38 | 227 | 122 | 1 | 50 | 0 | 17 | 632 |
| 31864 | 127 | 132 | 30 | 25 | 1 | 285 | 215 | 132 | 978 |
| 31872 | 144 | 67 | 285 | 38 | 157 | 48 | 249 | 175 | 0 |
| 31880 | 285 | 14 | 183 | 42 | 189 | 138 | 237 | 75 | 0 |
| 31888 | 187 | 138 | 237 | 62 | 48 | 4 | 237 | 67 | 186 |
| 31896 | 187 | 138 | 58 | 157 | 138 | 58 | 138 | 138 | 81 |
| 31904 | 187 | 138 | 157 | 138 | 58 | 138 | 58 | 7 | 638 |
| 31912 | 187 | 138 | 157 | 138 | 58 | 138 | 58 | 7 | 638 |

[illegible]

Programming: Amstrad

```

32280 47 295 30 107 48 249 195 289  * 1142
32215 121 175 265 14 180 20 12 3  * 757
32224 17 135 125 6 8 265 753 380  * 866
32227 23 14 5 17 143 122 6 18  * 361
32218 265 253 136 39 17 1 17 153  * 899
32248 122 6 19 285 253 136 62 47  * 954
32256 265 38 167 48 249 195 289 123  * 1228
32264 11 158 177 37 251 280 123 190  * 1823
32272 128 1 68 8 17 93 123 236  * 629
32280 176 237 75 90 123 265 2 129  * 9848
32288 63 4 265 23 129 265 128 128  * 624
32296 237 75 188 123 265 2 129 62  * 941
32304 5 265 23 129 265 168 128 277  * 1188
32312 75 123 123 265 2 129 52 6  * 725
32320 265 22 129 265 128 237 75  * 1178
32328 138 123 265 2 129 62 7 265  * 971
32336 126 167 48 5 78 25 35 16  * 1948
32344 126 167 48 5 78 25 35 16  * 485
32352 252 34 35 36 220 17 232 122  * 1872
32360 1 117 8 237 176 285 146 125  * 1880
32368 281 129 136 7 133 64 133 166  * 954
32376 133 228 123 9 134 51 134 153  * 975
32384 126 174 11 129 8 195 128  * 947
32392 125 267 125 8 1 2 5 18 583
32400 16 12 221 23 232 123 78  * 932
32408 8 221 35 197 221 880 4 265  * 1889
32416 29 129 125 78 8 221 78 1  * 743
32424 265 2 129 221 78 7 197 229  * 1856
32432 221 78 7 245 148 120 25  * 864
32440 35 16 234 247 255 1 88 6  * 629
32448 9 193 16 234 21 8 8 221 679
32456 5 193 16 267 261 221 33 93  * 972
32464 123 6 4 167 881 228 265 128  * 1253
32472 126 221 225 1 175 221 1  * 816
32480 193 16 148 265 221 265 6 78  * 1158

```

```

32488 37 95 58 218 122 225 198 0  * 936
32496 48 87 58 218 122 221 198 1  * 938
32504 48 79 221 53 4 48 51 221  * 787
32512 78 8 221 78 1 265 2 179  * 784
32520 221 128 3 48 21 129 265 168  * 1881
32528 128 221 136 0 221 134 2 221  * 3803
32536 119 8 79 221 136 1 221 134  * 961
32544 3 221 119 1 88 265 2 129  * 721
32552 221 126 5 265 23 129 265  * 1882
32560 126 261 221 126 2 221 68 221  * 1384
32568 119 7 221 126 3 227 68 221  * 897
32576 123 2 221 126 122 119 4  * 625
32584 281 221 280 6 78 32 37 221  * 961
32592 54 6 1 221 126 8 221 134  * 763
32600 9 221 119 7 221 136 1 221  * 975
32608 24 3 265 175 157 58 238 132  * 972
32616 221 198 7 32 8 58 219 122  * 857
32624 221 198 8 48 74 221 126 7  * 887
32632 221 134 18 221 119 8 58  * 779
32640 221 134 9 221 119 8 58  * 779
32648 216 127 221 198 7 32 8 58  * 856
32656 219 122 221 198 8 48 40 221  * 1861
32664 227 126 7 221 198 13 40 27 221  * 845
32672 126 8 221 198 14 40 35 221  * 839
32680 78 7 221 78 8 265 2 129  * 728
32688 221 125 11 285 23 129 265 168  * 1888
32696 126 221 54 6 8 281 62  * 872
32704 1 58 228 122 261 62 8 265  * 671
32712 38 187 32 7 62 72 265 38  * 625
32720 187 48 14 58 221 122 254 5  * 961
32728 268 61 58 219 122 48 4 24  * 738
32736 187 48 2 265 28 187 48 14 58  * 669
32744 122 254 24 268 48 30 219  * 1158

```

```

32752 122 62 1 24 53 62 8 265  * 537
32760 187 48 197 32 7 62 74 265 38  * 627
32768 187 48 14 50 258 122 254 2  * 957
32776 268 41 58 218 122 62 3 4  * 748
32784 25 62 1 265 38 187 32 6  * 548
32792 126 75 265 58 187 268 58 228  * 1893
32800 122 254 19 268 68 58 216 122  * 1845
32808 62 2 58 227 122 237 75 228  * 958
32816 122 265 2 129 62 17 265 21  * 768
32824 198 265 126 136 50 219 122 58  * 1990
32832 221 122 71 50 210 122 58 228  * 1887
32840 126 75 265 2 129 229 35 6  * 862
32848 8 126 254 12 48 6 134 191  * 778
32856 8 180 16 245 24 28 35 232  * 676
32864 53 222 122 95 32 8 25 24  * 579
32872 188 158 158 222 122 265 129  * 969
32880 225 24 39 229 213 887 245 6  * 1169
32888 8 197 6 4 229 26 119 25  * 624
32896 19 16 258 225 124 198 8 183  * 943
32904 229 137 217 245 6 8 137 6  * 1314
32912 4 229 26 174 119 35 19 16  * 622
32920 229 225 124 168 8 183 193 16  * 1115
32928 227 241 193 269 225 261 2 4  * 1512
32936 1 8 18 4 8 8 8 8 8 23
32944 1 18 8 24 19 25 255 358
32952 8 18 5 0 0 0 0 0 255  * 276
32960 9 18 8 4 1 24 0 255  * 201
32968 28 6 8 8 8 8 8 1 18  * 37
32976 28 38 8 8 28 5 1 28  * 94
32984 7 8 28 8 25 8 1 11 28  * 265
32992 0 8 232 53 176 157 68  * 712
33000 8 25 16 253 13 89 265 19  * 616
33008 265 19 22 9 25 269 281 17  * 696

```

INPUT MATCH

by Steven Underwood

One of the most powerful features of any computer is its ability to compare two items and to make a decision on the result. One of the most common demands made upon a computer is to compare a word inputted, with a list of words already in memory and once matched carry out the associated task.

This is heavily used in adventure games and any program that doesn't want to limit its user input to number driven menus. From Basic this is a simple task with lines of the form:

IF A\$ = "ONE" THEN ...

However, from machine code, it is a much more complicated matter, although still a highly desirable one. A program to do just that in 68000 machine code on the ST is presented here.

Lines that begin with a ";" are comments and need not be typed in, lines that end with ";" must be typed in as these are labels. The program will work on other 68000 computers provided that the input routine is replaced with an alternative one (lines 1-13) unless they also use GEM.

The program returns a zero in register D0 if no match is found, or else the number of the word in the list that matched the typed in word. This can then be used by your program to carry out the correct action. The list of words can be added to limited only by size of the memory of your computer! However, each word must be terminated with a '13' byte, and after the last word a '0' byte must be added to let the program know it has reached the end of the list.

Lines three to eight use the GEMDOS Call 10 to input a line of text up to 255 characters long. Since the list of words uses a '13' to mark their end, a '13' byte has to be added to the word typed in, and this is done in lines nine to 13.

Line 16 sets the word counter, register D0 to one, and lines 17 to 21 set up the registers A0-A4 so that they point at the list of words in memory (A2,A3), and the word typed in (A0,A1). Two registers are used in each case because each time the program loops round it 'loses' its starting point.

The main comparing loop is between lines 23 and 41. This compares each letter of the typed in word with the first word in memory, and then with each word in turn until the program either finds a match (Line 36) or runs out of match words (Line 39). Each time the program loops round D0 is increased by one (line 30), and in the case of no match is reset to zero (Line 40).

Lines 42 to 53 are the list of match words, and line 55 at the end of the program, is where the typed in word is stored in memory. If you use this program as a subroutine in your own, ensure that lines 55 onwards appear at the very end of your program and not in the middle! Otherwise the word typed in will be placed over part of your program and crash it!

```

1 START
2 INPUT A,WORD
3 MOV D0,WORD,WORD
4 MOV D0,WORD,WORD
5 MOV D0,WORD,WORD
6 TRAP #1

```

```

7 ADD D0,WORD,WORD
8 ADD A,13 TO THE END OF THE INPUTTED WORD
9 MOV D0,WORD
10 MOV D0,WORD,WORD
11 ADD A,13 TO THE END OF THE INPUTTED WORD
12 ADD D0,WORD,WORD
13 MOV D0,WORD,WORD
14 SET UP REGISTERS FOR THE MATCH
15 SET D0 COUNTER TO ONE TO START WITH
16 MOV D0,WORD,WORD
17 POINT TO INPUTTED WORD
18 MOV D0,WORD,WORD
19 MOV D0,WORD,WORD
20 MOV D0,WORD,WORD
21 MOV D0,WORD,WORD
22 POINT TO LIST OF WORDS IN MEMORY
23 MOV D0,WORD,WORD
24 MOV D0,WORD,WORD
25 MOV D0,WORD,WORD
26 MOV D0,WORD,WORD
27 MOV D0,WORD,WORD
28 MOV D0,WORD,WORD
29 MOV D0,WORD,WORD
30 ADD D0,WORD,WORD
31 MOV D0,WORD,WORD
32 MOV D0,WORD,WORD
33 MOV D0,WORD,WORD
34 MOV D0,WORD,WORD
35 MOV D0,WORD,WORD
36 MOV D0,WORD,WORD
37 MOV D0,WORD,WORD
38 MOV D0,WORD,WORD
39 MOV D0,WORD,WORD
40 MOV D0,WORD,WORD
41 MOV D0,WORD,WORD
42 MOV D0,WORD,WORD
43 MOV D0,WORD,WORD
44 MOV D0,WORD,WORD
45 MOV D0,WORD,WORD
46 MOV D0,WORD,WORD
47 MOV D0,WORD,WORD
48 MOV D0,WORD,WORD
49 MOV D0,WORD,WORD
50 MOV D0,WORD,WORD
51 MOV D0,WORD,WORD
52 MOV D0,WORD,WORD
53 MOV D0,WORD,WORD
54 MOV D0,WORD,WORD
55 MOV D0,WORD,WORD
56 MOV D0,WORD,WORD
57 MOV D0,WORD,WORD
58 MOV D0,WORD,WORD
59 MOV D0,WORD,WORD
60 MOV D0,WORD,WORD
61 MOV D0,WORD,WORD
62 MOV D0,WORD,WORD
63 MOV D0,WORD,WORD
64 MOV D0,WORD,WORD
65 MOV D0,WORD,WORD
66 MOV D0,WORD,WORD
67 MOV D0,WORD,WORD
68 MOV D0,WORD,WORD
69 MOV D0,WORD,WORD
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71 MOV D0,WORD,WORD
72 MOV D0,WORD,WORD
73 MOV D0,WORD,WORD
74 MOV D0,WORD,WORD
75 MOV D0,WORD,WORD
76 MOV D0,WORD,WORD
77 MOV D0,WORD,WORD
78 MOV D0,WORD,WORD
79 MOV D0,WORD,WORD
80 MOV D0,WORD,WORD
81 MOV D0,WORD,WORD
82 MOV D0,WORD,WORD
83 MOV D0,WORD,WORD
84 MOV D0,WORD,WORD
85 MOV D0,WORD,WORD
86 MOV D0,WORD,WORD
87 MOV D0,WORD,WORD
88 MOV D0,WORD,WORD
89 MOV D0,WORD,WORD
90 MOV D0,WORD,WORD
91 MOV D0,WORD,WORD
92 MOV D0,WORD,WORD
93 MOV D0,WORD,WORD
94 MOV D0,WORD,WORD
95 MOV D0,WORD,WORD
96 MOV D0,WORD,WORD
97 MOV D0,WORD,WORD
98 MOV D0,WORD,WORD
99 MOV D0,WORD,WORD
100 MOV D0,WORD,WORD

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| Run Up Master | 1.95 | 7.00 | 7.00 | 7.00 |
| Prolog | 1.95 | 7.00 | 7.00 | 7.00 |
| YOUNG BRIDGE WITH US | 1.95 | 7.00 | 7.00 | 7.00 |
| AMSTRAD | 1.95 | 7.00 | 7.00 | 7.00 |
| Elite | 1.95 | 7.00 | 7.00 | 7.00 |
| Advent | 1.95 | 7.00 | 7.00 | 7.00 |
| Reinhold | 1.95 | 7.00 | 7.00 | 7.00 |
| Reaper on Vidge | 1.95 | 7.00 | 7.00 | 7.00 |
| They need a Million | 1.95 | 7.00 | 7.00 | 7.00 |
| Superman | 1.95 | 7.00 | 7.00 | 7.00 |
| Bagpipes | 1.95 | 7.00 | 7.00 | 7.00 |
| Doubleback in Revenge | 1.95 | 7.00 | 7.00 | 7.00 |
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Programming: Peek & Poke



ST colour

Paul Lambert of Maids Vale, London W9 writes:

Q I am intending to buy an Atari 520 STM but now that I have found out that it can only support low resolution when using television, I also want to buy a monitor.

What I want to know is that if I buy a colour monitor such as the Chroma I from Chromagraphics, which boasts 885 x 585 pixels, can it be used with all the graphics modes on the ST including the monochrome 640 x 400 pixels? If not, are there any other monitors which can support both colour and monochrome displays?

A One of the main problems with the ST is its monitor output (see *Popular Computing Weekly*, Vol 5 No 23) as there are two separate outputs, one for monochrome and one for colour. The colour signal is standard RGB, unfortunately, the mono output is 70Hz and so will not work with anything except a special monitor (Atari SM124). The advantage of the mono display being at 70Hz (most British micros are at 50Hz) is that the picture is rock steady and very clear.

As far as I know, there are no monitors that can cope with both 70Hz mono and standard RGBs so your only solution is to buy the SM124 if you want the high res mono picture. This will cost you £475 for the STM plus mono monitor, the price you pay for a 'leading edge' machine.

Sprite approach to MSX

M Alvey of Abingdon, Oxfordshire, writes:

Q I have had an MSX machine for a year or so now, and have finally become interested in programming. After messing around with the sprites, I have noticed that it is not possible to have more than four sprites in a row across the screen. How can I find out which sprite has not been displayed?

Could you also recommend a good book about the MSX.

A Unfortunately, one of the limitations of the MSX sprite system is that it only allows four sprites to be placed across the screen at one time. Using the VDP command, it is possible to work out which sprite is violating this.

PRINT VDP(8) AND 31 tells you which sprite it is, and PRINT VDP(8) AND 64 can be used to find out if the rule is being broken (gives 1 if there are more than four sprites across the screen, zero otherwise).

The best book on the subject is *The Complete MSX Programmers Guide* from Melbourne House.

On spec

C Baker of Hounslow, Middlesex writes:

Q I own a Spectrum Plus and am having a little difficulty which, I hope, you can sort out for me.

I am writing a program to ask a set of questions. How do I set up an array to store 100 questions and answers? I have the manual but the arrays don't seem to work.

A One of the stranger things about the Spectrum Basic is the way in which string arrays are defined. Unlike most other Basics, you need to specify the length of the string (number of characters it will hold), as well as the number of strings in the array. This effectively adds an extra dimension to the array definition.

In most standard Basics, DIM Q\$(100), tells the computer to set aside a dynamic amount

of space (all the strings are of zero length until something is put into them) for 100 strings. On the Spectrum, you will need to work out which is the longest question and then set up the string with array with that size, eg. say the longest question consists of 20 characters then the array definition will be DIM Q\$(100,20). This tells the computer to set aside space for 100 rows of 20 characters each, about 20K bytes. You will then need to do the same for your answers, hence an array of DIM A\$(100,20). The problem is, on the Spectrum all of this space is set aside, not leaving very much room if any, for the program. You will need to keep the questions short, perhaps by making them all have the same intro, eg. 'What is' and then the question string.

The confusion begins when you actually need to access a string array. If you want the complete contents of the string, simply use Q\$(n) where n is the question number. If, however, you want a section of a line of the array, the length of the string is needed. So if Q\$(1) is 'What is your name', PRINT Q\$(1) gives 'What is your name', while PRINT Q\$(1,7) gives 'What is'. Hopefully this makes things a little clearer.

Which one?

P R Grove of Coulsdon, Surrey, writes:

Q We are looking for a new computer capable of running a wordprocessor, database and the occasional game. The main contenders are the Amstrad CPC 6128, PCW 8512, or PCW 8256. Which one would you recommend?

Could you also give the names of a good wordprocessor and database for the 6128? Do you think that it is worth buying the colour monitor instead of the green monitor?

A The computer games market currently produces games mainly for the CPC range of Amstrad micros; the

PCW range is only covered by a few (though this is changing) software houses. From this point of view, the better computer to buy is probably the 6128 except that you will need to buy a printer as well.

Pocket Wordstar is a reasonably good wordprocessor at £50 from Micropro. It has years of experienced users to write manuals to help you learn what is essentially a fairly straightforward system.

Cardbox is a pretty simple database at £100 from Caxton. Again, it has been around for quite a while but lacks many advanced features one would expect from a database such as being able to get totals from sets of figures, etc. It is, however, very simple to use and is handy for quick access to phone numbers, addresses, etc.

It may be better to have a look around the Amstrad mags and then go to a dealer and see a package in action before buying, at least you know what you're getting. Another alternative might be to wait and see if Amstrad's rumoured IBM clone appears - the near future, since there are a number of games and vast quantities of good software available for IBM machines.

If you are thinking of playing the occasional game with your Amstrad, a colour monitor is the better buy. Unfortunately, for business applications it can sometimes be a little blurred.

Other games

Alan Franklin of Victoria, London SW1 writes:

Q I have a Spectrum Plus and hundreds of ZX81 games. I wonder if you could please tell me how to run ZX81 games programs on the Spectrum Plus.

A The most obvious answer to this is, forget it, you can't run ZX81 programs on the Spectrum Plus. The differences between the two machines are quite major.

Having said that, it may be possible to write some software to allow the Spectrum to emulate the ZX81, and interpret the ZX81 instructions. However, I don't know of any commercial software to do this so, you'd have to do it yourself (not easy).

Is there anything about your computer you don't understand, and which everyone else seems to take for granted? Whatever your problem *Peek It* to Ken Garroch and every week he will *Poke* back as many answers as he can. The address is *Peek & Poke*, PCW, 12-13 Little Newport Street, London WC2R 3LD

Screen Handler on QL by Doug Lockhart

Having used a BBC recently I came to prefer that machine's screen handling over the QL's. The idea that you can use the whole of the screen rather than a measly four lines makes more sense.

Having reached this conclusion I decided to write a program to do just that. The program's only limitation is that all display commands, such as *Print* and *List*, must be suffixed by 0, (hash zero comma). If this is not done, then the screens may clash and output will not be directed to the appropriate part of the screen.

```
10 FOR a=0 TO 2
20 CLOSE #a
30 OPEN #a,com_452x236a30x10
40 MODE 4
50 PAPER #a,0
60 INK #a,7
70 CLS #a
80 END FOR a
90 PRINT #1,"BBC BASIC 32K"
100 PRINT #0\\
```

Memory Exposed on BBC by Mark Lucknam

The following program provides a quick and easy method of examining the contents of memory. When run, the program asks for the start location of the dump, which should be entered as a decimal number. The option of using a printer is given but you should be aware of the fact that some printers do not provide a carriage return automatically. In this case the command, "Fc6.0 should be entered before running the program.

Pressing the space bar will dump each subsequent location, its contents and the ASCII character it represents. The memory location contains a value of 31 or less is represented as "?" to avoid crashing the program.

Pressing 'Q' exits from dump, turning the printer off and resetting the text window as it goes.

```
10CLS:INPUT"Enter start location ":AX
20PRINT" Dump to printer ? (Y/N):BX:GET:CLS
30PRINTTAB(131);IFBX=89ORBX=121PRINT"Printer ON"ELSEPRINT"Printer OFF"
40PRINTCHR#129CHR#157CHR#131;"Location Contains Character"
50VDU28,0,24,39,2
60IFBX=89ORBX=121VDU2
70FORCX=AXTO65535
80PRINTTAB(5);CX;TAB(16);CX;TAB(26);
90IFCX<32PRINT"?"ELSEPRINTCHR#(CX)
100FX21,6
110BX=GET:IFBX=81VDU3,26;PRINTTAB(0,24);END:ELSENEXT
```

Printer Shades on Spectrum by P-Hiley

This utility produces a fully shaded screen copy on an ordinary ZX printer. Although it has not been tested with thermal replacements for the ZX printer (eg, the Alphacom), it may work with those which allow the normal *Copy* command to be used.

After running the hex loader, save it with *Save "shade" Code 1252,126*. It can be reloaded to any address using *Load "" Code (address), and* executed by *Randomize User (address)*.

As the contrast of the image is fairly poor, a dark picture may be improved by producing a negative image, so load in the routine and type *Poke ad+55-3, Poke ad+56.0, Poke ad+65-2* where *ad* is the start address. These values are normally 29, 237 and 1 respectively.

```
1 REM ** 'Printer Shade.'**
2 REM (c) P.Hiley.
3 DEF FN V(A$)=CODE A$-35+(7 AND A$*(A*))
5 REM Note the capital "A"
10 LET A0=4E4: REM Start address.
20 READ A$,S
30 IF A$="" THEN GO TO 9999
40 LET C=0: FOR L=1 TO 16 STEP 2
50 LET N=FN V(A$(L))+16*FN V(A$(L+1))
60 POKE A0,N
70 LET C=C+N: LET A0=A0+1
80 NEXT L
90 IF S=C THEN PRINT "ERROR" A$: STOP
100 20
199 REM Use Caps Lock for the Data.
200 DATA "F301000000210003",762
210 DATA "C572F0039FE6025F",1060
220 DATA "D3FB8C0A22000F",1346
225 REM
230 DATA "87CB7F2003FBCF12",984
240 DATA "30F40E201600CB06",577
250 DATA "D07E0A3005E6300F",789
255 REM
260 DATA "1804E60707070610",522
270 DATA "ED4400CB0762002",881
280 DATA "C682479707B1F30",971
285 REM
290 DATA "FA70F68002F210FE",1479
300 DATA "7803F8152000C00",1111
310 DATA "230200C13E7F0",881
315 REM
320 DATA "FE1F30073EFED0FE",1137
330 DATA "1F300783DE60723",550
340 DATA "0511E0FFD019100",907
345 REM
350 DATA "3E0403FBFC00000",500
400 DATA "",0
```

[illegible]



Cracking the code

David Wallin tackles communications confusion with a brief look at the ASCII codes and their uses.

A Character Code is a method of referencing the characters that a computer can send. A number is given to each character and it is that number, in its binary form that is sent down the phone line, or whatever is being used to link two computers.

ASCII is the most common character code there is. Other names for it are CCITT V3 and International Alphabet 5. Probably the next most common code is EBCDIC, Extended Binary Coded Decimal Interchange Code which is used extensively on the IBMs and compatibles.

As you can see, it's a seven bit code, that means that the binary versions of each code contains seven bits (bit binary digit). The eighth bit can be used for parity, or may always be one or always be zero. Here, I have kept it set to 0.

ASCII codes from 0 to 32 (decimal) and code 128 are special control codes, and are usually generated by the CHARACTERI. Some of the codes though, often have their own key, for example, the tab key. Many computers have, or will have a TAB key, which will return an ASCII value of nine (decimal) which is an ASCII TAB code. And although it can be generated by the TAB key as standard.

The definitions of the St codes are as follows:

NUL

NUL - This is a blank or null character. When a NUL is sent, time passes, but no information is changed. Bulletin Boards can be asked to send from 1 to 50 NULs after each return, different computers need different number. If you don't know how many you need try from 5 to 10.

SOH

Start Of Header - when sent, this means that what is about to come is the header to a block of information.

STX

Start of Text - this marks the end of the header and the beginning of the information (text) that it was the header to.

ETX

End of Text - this marks the end of a piece of information (text).

EOT

End Of Transmission - this is sent to indicate that transmission has ended.

ENQ

ENQUIRY - sent by the host computer to ask the remote computer to send some

information. Used on Prestel and Viewdata boards ask for the customer ID which is often stored in the remote computer's memory and is sent automatically on reception of an ENQ. Often thought of as the question 'Who?'

ACK

ACKnowledge - sent to confirm that a block of information has been received correctly. Used on XMODEM data transfer to say that the checksum test worked.

BEL

BEL - when received, this emits a bleep on the computer and is sometimes used for a 'Pager' to the SYSOP to indicate that mode has been requested.

BS

Back Space - this code will move the cursor/print head back one space but NOT

delete the character. Often on a keyboard, labelled as CANCEL or HT.

Horizontal Tab - this moves the cursor to the right a set number of places. It has the same effect as the TAB key found on some computers. Some computers do not allow setting of tab positions and move by either 9 to 7 places.

LF

Line Feed - Moves the cursor/print head down a line, but the column stays the same. Most printers have an LF button.

VT

Vertical Tab - this moves the cursor/print head to a specified position. Similar to HT.

FF

Form Feed - Moves the print head to the

| Binary Value | Deci Value | Hexa- mal Value | ASCII Character | Keyboard Character |
|--------------|------------|-----------------|-----------------|--------------------|
| 00000000 | 0 | 0 | NUL | ␣ |
| 00000001 | 1 | 1 | SOH | ␣A |
| 00000010 | 2 | 2 | STX | ␣B |
| 00000011 | 3 | 3 | ETX | ␣C |
| 00000100 | 4 | 4 | EOT | ␣D |
| 00000101 | 5 | 5 | ENQ | ␣E |
| 00000110 | 6 | 6 | ACK | ␣F |
| 00000111 | 7 | 7 | BEL | ␣G |
| 00001000 | 8 | 8 | BS | ␣H |
| 00001001 | 9 | 9 | HT | ␣I |
| 00001010 | A | A | LF | ␣J |
| 00001011 | B | B | VT | ␣K |
| 00001100 | C | C | FF | ␣L |
| 00001101 | D | D | CR | ␣M |
| 00001110 | E | E | SO | ␣N |
| 00001111 | F | F | | ␣O |
| 00010000 | 16 | 10 | DLE | ␣P |
| 00010001 | 17 | 11 | DC1 | ␣Q |
| 00010010 | 18 | 12 | DC2 | ␣R |
| 00000011 | 13 | 13 | DC3 | ␣S |
| 00010100 | 20 | 14 | DC4 | ␣T |
| 00010101 | 21 | 15 | NAK | ␣U |
| 00010110 | 22 | 16 | SYN | ␣V |
| 00010111 | 23 | 17 | ETB | ␣W |
| 00011000 | 24 | 18 | CAN | ␣X |
| 00011001 | 25 | 19 | EM | ␣Y |
| 00011010 | 26 | 1A | SUB | ␣Z |
| 00011011 | 27 | 1B | ESC | ␣[|
| 00011100 | 28 | 1C | FS | ␣\ |
| 00011101 | 29 | 1D | GS | ␣] |
| 00011110 | 30 | 1E | RSL | ␣^ |
| 00011111 | 31 | 1F | US | ␣_ |
| 00100000 | 32 | 20 | SP | ␣SPACE |
| 01111111 | 127 | 7F | DEL | ␣Delete |

top of the next piece of paper on the printer.

CR

Carriage Return - this moves the print head to the start of the current line. It does NOT perform an LF as well.

SO

Shift Out - used to signify that the following characters are not ASCII standard. Applies to all following text until a ■ is reached. Usually used to add graphics to the character set. Codes 0-31 remain the same.

■ Shift In - signifies that the following characters are standard ASCII. Used to end a block of SO characters.

DLE

Data Link Escape - Changes the meaning of the next set of characters. Only graphics (values greater than 127) and transmission on control characters can be used in a DLE sequence.

DC1 DC2 DC3 DC4

Device Control Number (devices are numbered one to four - four characters used in the control of other devices. DC1 - DC3 have well known uses;

DC1: *Xon* (handshaking)

DC2: *Tape*

DC3: *Xoff*

NAK

Negative Acknowledge - sent to say that a block of information has been received with errors and to request a re-transmission. Used on XMODEM data transfer to

say that the checksum test failed.

SYN

SYNchronous idle - used in synchronous transmission while no data ■ being sent, to enable the computers to stay synchronised.

ETB

End of Transmission Block - indicates that transmission of a block of data has ended.

CAN

CANcel - informs the other computer that it has just received an error. Should not be confused with the keyboard key. CAN, which usually generates BS.

EM

End ■ Medium - indicates that the end of a medium (eg a tape) has been reached.

SUB

SUBstitute - used to substitute a character which was sent wrongly.

ESC

ESCAPE - used to change the meaning ■ the next character only. Used in communications packages to enable the user to perform an operation such as XMODEM transmit without using up valuable ASCII control codes which are needed.

FS

File Separator - ends a block of information called a file.

GS

Group Separator - ends a block of information called a group.

RS

Record Separator - ends a block of

information called a record.

US

Unit Separator - ends a block of information called a unit.

DEL

DElete - erases an unwanted character. Effectively, it moves the cursor/print head back one character, prints a space and then moves back again.

The Return/Enter key on your computer usually has an ASCII value of 13, which is [CR] not [CR] [LF]. So therefore, the host computer must not only echo back a [CR] when you type one but an [LF] as well. This is called an [NL]. New Line and is ASCII 11 followed by ASCII 13. When in BASIC or another language, the OS will automatically give an [NL] when Return/Enter is pressed.

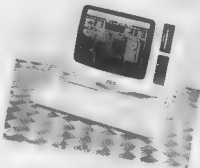
All of the codes can be used locally as well. That means that they can be typed on your computer and affect your computer.

To the person who just uses a modem and computer to access Micronet and the odd Bulletin Board, the past 2 weeks will have been rather boring. I would like to apologise to those people concerned, before they get a chance to write and complain! Seriously though, to the person who uses comms seriously, an ASCII list and control codes list, is ■ invaluable. Although most books and manuals have one, it's always in the back, when you need the book open at the front! So a separate list is very useful.

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Sound terminology

MARK JENKINS on micro music terminology and Spectrum packages . . .

Before we go onto some of the latest developments in micro music, it seems that an explanation of some common terms would be useful. Chris Jordan of Hybrid Technology, the developers of the powerful Acorn 500 synth module for the BBC B, has been in touch with some sections from the handbooks of the 500 and its AMPLE programming language, so with some adaptation, here's the first part of our micro music glossary.

ACCIDENTAL

In conventional music notation, the temporary modification of the pitch of a note, either a *semitone* up (sharp) or down (flat).

ADSR

Simple description of a standard envelope or change in a parameter over time, standing for *attack*, *decay*, *sustain*, *release*. Applied to an amplifier to control volume or to a filter to control tone.

AMPLITUDE

Technical term for Level.

ATTACK

The build-up in *amplitude* of a parameter from the start of a note (when a key is pressed or a command sent) to its highest level. Attack is a measure of time - a fast attack means a sound begins suddenly, like a piano, a slow attack means it begins gradually, like a string section.

ANALOG

Using conventional electronics to produce sounds; analog synths (Roland, Korg, Sequential) can be digitally controlled and MIDI-compatible, but tend to sound fatter and smoother than digital synths (Casio, Yamaha).

BAR

A division of musical time. Every bar has the same total of note lengths, and so if the tempo is steady, each bar lasts for the same amount of time.

BAR LINE

Score mark which ends one bar and begins the next.

BEAT

Shortest musical division in use in any time.

CHANNEL

Various applications; on the Acorn 500 refers to a single sound generator with its own pitch and stereo position, a MIDI application to the 16 coded transmission lines which can each control one or more synthesisers polyphonically, on a mixing desk to an input for one instrument, and so on.

CHORD

Two or more notes sounded together; the relationships of the notes determine the type of chord - major, minor, seventh, and so on.

CHORUSING

Thickening a sound by giving the impression of more than one instrument playing the same notes. Can be achieved by programming a second voice with slight *detuning*, or by adding a hardware chorus unit such as a *delay* line.

DECAY

The decreases in amplitude of a parameter after the end of the *attack* phase. Decay is a measure of time, and the amplitude decays to the *sustain* level. A piano has a long or slow Decay, since the notes fade while the keys are still held down; an organ sound has no decay, since it stays at the same volume for as long as a key is held.

DELAY LINE

Hardware intended to store a sound temporarily and re-mix it with the original. Creates echo, chorus and various other effects.

DE-TUNING

Slightly altering the pitch of one of a pair of sounds, by a fixed or variable amount, to create thicker sounds.

ENVELOPE

Description of the change in level of a parameter over time. On a synthesiser, controlled by an Envelope generator (EG), or ADSR, can be applied to volume, filter-

ing, pitch, pulse width or other parameters.

EQUALISATION

Time-honoured term for the control of tone, achieved with a graphic or parametric equaliser, or most simply with bass and treble controls on an amplifier.

More of the Micro Music Glossary next week. Now, on to some news from XRI Systems.

XRI now have several MICON MIDI products for the 48K Spectrum and are about to launch their Amstrad 8256 range. Already available, the Step Time Sequencer uses XRI's MIDI Interface (£59.95) to compose music in eight tracks of up to 2,900 steps for a total of 26,200 steps.

Notes are entered from the keyboard of a MIDI synth and timings are entered from the computer. Single notes or chords can be entered, sequences can be saved to cassette or microdrive and tracks can be assigned to different MIDI channels on playback.

The package synchronises to MIDI or a clock pulse, but XRI also sell three sync boxes - MIDI-Tape/Tape-MIDI for £55.95, MIDI-DIN Sync/DIN Sync-MIDI for £49.95, and MIDI-Tape & DIN SYNC/Tape-MIDI & DIN Sync for £65.95.

Other products include a Yamaha DX7/TX7 synth graphic voice editor (£24.95), a Casio CZ synth graphic voice editor (£22.95), a DX7/TX7 voice library with 224 new sounds and tape save (£24.95), a Roland Juno 106 synth Toolkit editor/library (£19.95) and a Database System for patch and song tape save from most synths and drum machines (£22.95).

The new Multi-Tracker program records eight polyphonic tracks in real time and can auto-correct your playing synchronised to a metronome beat, a drum machine, a MIDI unit or a previous track. Bars can be added, inserted, deleted and repeated to create a complete song and different MIDI channels can be assigned to each track on playback.

Microdrive or Opus Discovery may be used to store sequences which can be over five minutes long. Price is £24.95, with an expanded version coming up for £16 (exchange) or £38.95 for the two programs bought together.

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John Cook looks through this week's new arrivals

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Amstrad CPC Price £7.95 (tape)
£14.95 (disc) **Supplier** Global
Software, PO Box 67, London
SW11 1BS.

Program Monsters of Murdachs
Type Text Adventure Micro
PCW 8256/8512 Price £19.95
Supplier Global Software, PO
Box 67, London SW11 1BS.

Program Harvey Headbanger
Type Arcade Micro Amstrad
CPC Price £1.99 **Supplier** Fire-
bird Software, Wellington
House, Upper St Martins Lane,
London WC2.

Program Knight Games Type
Arcade Micro Amstrad CPC
Price £8.95 (tape) £14.95 (disc)
Supplier English Software, 1
North Parade, Personage Gar-
dens, Manchester, M60 1BX.

Program Amstrad Shuffle Type
Strategy Micro Amstrad CPC
Price £4.95 **Supplier** Alpha
Omega, 9 Kings Yard, Carpen-
ters Rd, London E15.



Program Instant Access Type
Utility Micro Amstrad CPC
Price £29.95 **Supplier** Minerva
Systems, 69 Sidwell St, Exeter,
Devon, EX4 6PH.

Program Random Database
Type Utility Micro Amstrad
CPC Price £39.95 **Supplier** Mi-
nerva Systems, 69 Sidwell St,
Exeter, Devon, EX4 6PH.

Program First Base Type Utility
Micro PCW 8256/8512 Price
£29.95 **Supplier** Minerva Sys-
tems, 69 Sidwell St, Exeter,
Devon, EX4 6PH.

Atari ST

Program Atari DB Calc Type
Utility Micro Atari ST Price
£???.?? **Supplier** Robtek, Unit 4,
Isleworth Business Complex,
St Johns Road, Isleworth,
Middx, TW7 6NL.

Program Cards Type Strategy
Micro Atari ST Price £19.95
Supplier Microdeal, PO Box 66,
Austell, Cornwall, PL25 4YB.
I quote, 'Cards offers a re-
freshing break from arcade-
style games...' I can re-
member getting the same
sinking feeling when a com-
pany representative once intimat-
ed of his game, 'I think people
are getting tired of good graph-
ics and sound.'

Still, Microdeal do deserve
some credit for getting hold of
great quantities of American
ST software (all written by
Michtron so far) and bringing it
over to the UK - even if this
blunderbuss approach is
sometimes off the mark.



Cards will grab hold of your
68000 based, state-of-the-art
machine and allow you to play
Solitaire, Klondike, Poker
Squares and Cribbage against
the computer or by yourself (as
applicable) or play Blackjack
(Pontoon) with up to four others
against the machine. The
graphics are satisfactory and
it's nice to see that full use is
made of the mouse for selecting
options, cards, etc.

Two things count heavily
against the package - explana-
tion of the rules are minimal
and the thing doesn't play pok-
er. An American selection of
card games that doesn't in-
clude Poker! The Moral Major-
ity have got a lot to answer for -
I can see Doc Holliday turning
in his grave. For ST green-
horns only I would say - what-
ever - it's to be played with the
boots firmly off.

Pick of
the week

Program Leader Board Type
Arcade/Strategy Micro CBM
64 Price £9.95 (tape) £14.95
(disc) **Supplier** US Gold, Unit
10, The Parkway Industrial
Centre, Hensage St, Bir-
mingham B7 4LY.

It's been an above par
season for golf games -
recently the creditable
Golf Construction Set (reput-
edly coded by Hungarian
programmers who had never
even set eyes on a golf
course), now topped by
Leader Board from US Gold.

I'd be surprised if none of
the American Access team
played golf - it's a suburban
obsession over there. And
that obsession has shown
itself up in the accuracy of
the simulation and the at-
mosphere of tension and excite-
ment that **Leader Board** can
create.

Without going into the fin-
er details of the controls (for
that see the full review next
week) the game manages to
combine playability with a
crucial need for intense con-
centration and timing.

Like the real game, sloppi-

Leader Board

ness is punished severely,
as the smallest hint of slice
or hook can send your ball
whizzing off into the water.
Water? Yes; water (and the
excellent sound effect that
accompanies its demise into
the deep) will become an all
too familiar companion on
the way round this particular
golf course, as it seems to
played mainly on a series of
islands. Think of Wentworth
flooded up to depth of about
five feet and you've got the
idea.

Up to four players (the
more the better) can battle it
out over four 18-hole
courses - and there's no de-
nying that this is by far the
best golfing simulation to
date. Access have succeed-
ed in capturing the claustro-
phobic, coiled excitement
that attracts the crowds.

Of course, it's not going to
improve your handicap any,
but if you want to know what
it feels like walking into the
18th green with \$100,000 rid-
ing on a fifty foot putt - this is
the closest most of us are
going to get.

Program Introduction to Logo
on the Atari ST Type Educa-
tional Micro Atari ST Price
£19.95 **Supplier** Microdeal, PO
Box 66, St Austell, Cornwall,
PL25 4YB.

BBC B/Electron

Program AMX Zap Zone Type
Arcade Micro BBC B Price
£4.95 **Supplier** AMS 166-70
Wilderspool Causeway, War-
rington, WA4 6QA.

Program AMX Mind Games
Type Strategy/Educational Mi-
cro BBC B Price £14.95 (disc)
Supplier AMS 166-70
Wilderspool Causeway, War-
rington, WA4 6QA.

Program Thrust Type Arcade
Micro BBC B/Electron Price
£7.95 (tape) £11.95 (disc) **Sup-
plier** Superior Software, Dept
TH1, Regent House, Skinner
Lane, Leeds, LS7 1AX.

Program AMX Pagemaker
Type Utility Micro BBC B Price
£???.?? **Supplier** AMS,
Wilderspool Causeway, War-
rington, WA4 6QA.

C16/Plus 4

Program C16 Greatest Hits
Type Compilation Micro C16
Price £7.95 **Supplier** Mel-
bourne House, 60 High St,
Hampton Wick, Kingston upon
Thames, Surrey, KT1 4DB.

Program Booty Type Arcade
Micro C16/Plus 4 Price £1.99
Supplier Firebird Software,
Wellington House, Upper St,
Martins Lane, London WC2.



CBM 64

Program Floyd the Droid Type
Arcade/Strategy Micro CBM ■
Price £9.95 Supplier Ariolasoft
UK, 68 Long Acre, Convent
Garden, London WC2E 9JH.

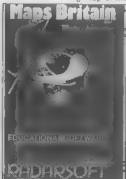
Program Database Type Utility
Micro CBM 64 Price £9.95 Sup-
plier Ariolasoft UK, 68 Long
Acre, Convent Garden, London
WC2E 9JH.

Program Maps (Britain) Type
Educational Micro CBM ■
Price £6.95 Supplier Ariolasoft
UK, 68 Long Acre, Convent
Garden, London WC2E 9JH.

It's a pity that so much edu-
cational software that
passes through seems to be
of the simple question/answer
multiple choice variety, without
using the computer more
imaginatively. At least it does
make the exceptions stand out
more – such as *Maps Britain*.

What you have here is es-
sentially a program that will
teach a child the basic place
name geography of the United
Kingdom (and Eire) without
tears.

Its best feature is a game
which has you flying a helicop-
ter over a scrolling map of the



UK. You are asked to visit a
series of locations within a
strict time limit – the problem is
that the map does not contain
place names and only marks
the very major cities. (You are
given a clue as to what your target
location will flash if you pass
very near it. The more loca-
tions you get to (identify) the
more points you get – and if
you visit enough, extra time is
added, but now the place
names are more obscure.
(Where the hell is Milford Ha-
ven anyway?)

Such competition is ideal
carrot and stick fodder to get
anyone studying their atlas.

Other features are a search
facility (which will look for any
particular town you enter and
display it on the map if it is in
the program's database) and a
straightforward quiz section,
which will point to an area and
ask what county it is, for
example.

I wasn't too impressed with
the latter – any program that
rejects 'Devon' as an answer,
when what it wanted was 'Dev-
onshire' cannot be said to be
without fault – nevertheless,
for the helicopter game alone, this
is excellent education
amusement.

Program Touchdown Football
Type Arcade Micro CBM 64
Price £9.95 (tape) £14.95 (disc)
Supplier Ariolasoft UK, 68 Long
Acre, Convent Garden, London
WC2E 9JH.

**Program Murder on the Missis-
sippi Type Adventure Micro**
CBM 64 Price £14.99 (disc only)
Supplier Activision, Activision
House, ■ Pond St, London
NW3.

**Program Speed King Type Ar-
cade Micro CBM 64 Price £1.99**
Supplier Mastertronic, 8-10
Paul St, London EC2.

**Program Ninja Master Type Ar-
cade Micro CBM 64 Price £1.99**
Supplier Firebird Software,
Wellington House, Upper ■
Martins Lane, London WC2.

Program Knight Games Type
Arcade Micro Commodore 64
Price £8.95 (tape) £12.95 (disc)
Supplier English Software, 1
North parade, Parsonage Gar-
dens, Manchester, M60 1BX.

MSX

Program Scrabble Type Strategy
Micro MSX Price £9.95 Sup-
plier Virgin Games, 2-4 Vernon
Yard, Portobello Rd, London
W11 2DX.



PCW 8256/8512

Program Monsters of Murdac
Type Text Adventure Micro
PCW 8256/8512 Price £19.95
Supplier Global Software, PO
Box 67, London SW11 1BS.

Program Monopoly Type Strategy
Micro MSX Price £9.95
Supplier Virgin Games, 2-4
Vernon Yard, Portobello Rd,
London W11 2DX.

Program Cluedo Type Strategy
Micro MSX Price £9.95 Sup-
plier Virgin Games, 2-4 Vernon
Yard, Portobello Rd, London
W11 2DX.

Program First Bass Type Utility
Micro PCW 8256/8512 Price
£29.95 Supplier Minerva Sys-
tems, 69 Sidwell St, Exeter,
Devon, EX4 6PH.

Spectrum

Program Grimble Type Adventure
Micro Spectrum Price
£2.20 Supplier MicroTech, ■
Whitley Spring Cres, Osselt, W
Yorks, WF5 0RF.

Program 2001: A Space Idiot
Type Adventure Micro Spec-
trum Price £2.20 Supplier
MicroTech, 88 Whitley Spring
Cres, Osselt, W Yorks, WF5
0RF.

Program Rebel Star Type Strategy
Micro Spectrum Price
£1.99 Supplier Firebird Soft-
ware, Wellington House, Upper
St Martins Lane, London WC2.

You don't expect to see
strategy games turning up
on a budget label as a
rule – but in the latest batch of
releases from Firebird lurks
one such beast – *Rebel Star*.
Played as a one or two player
game (in the one player ver-
sion, the Spectrum gets to play
the defenders) it depicts the
assault on Moonbase Delta by
a mixed bunch of Rebels and



assorted droids, while the de-
fenders (mainly droids) do
their best to keep Kurt Levine
and his pals out.

Each player takes his turn ■
move all, some or none of his
forces on a scrolling playing
area about six screens by
three. All activity, ie, move-
ment, combat, using objects
takes a certain number of 'Ac-
tion Points' – and when a piece
has used up all of its action
points for that turn, it's on to the
next one – a concept familiar to
most wargamers.

Overall, there's more to ■
than originality meets the eye.
It's obviously been carefully
programmed – and despite the
less than impressive graphic
display, lovers of computer
wargames are unlikely to find
they have wasted £1.99 on this
one.

**Program Conquest Type Ar-
cade Micro Spectrum Price**
£2.99 Supplier mastertronic, 8-
■ Paul St, London EC2.

Program Poster Machine Type
Utility Micro Spectrum Price
£5.95 Supplier Softcat, PO
Box 79, Macclesfield, Cheshire,
SK10 3NJ.

Program Posh-List Type Utility
Micro Spectrum Price £2.95
Supplier Delta Software, 12
Endersdale Rd, London SE13
6JD.



QL

Program Peintre Type Utility
Micro QL Price £14.95 Sup-
plier Reo Promotions, 28 Waverley
Grove, London N3 3PX.

Program Nucleon Type Utility
Micro QL Price £19.95 Sup-
plier Reo Promotions, 28 Waverley
Grove, London N3 3PX.

Top Twenty

- 1 (2) Ghosts and Goblins
- 2 (1) Green Beret
- 3 (18) Ninja Master
- 4 (4) Kik Start
- 5 (5) Formula One Simulator
- 6 (3) World Cup Carnival
- 7 (16) Kane
- 8 (8) Way of the Tiger
- 9 (13) Commando
- 10 (6) Street Olympics



Biggles

- 11 (7) Biggles
- 12 (-) Molecule Man
- 13 (14) Last V8
- 14 (-) They Sold (2)
- 15 (12) Knight Time
- 16 (-) Heavy On the Magik (Spectrum)
- 17 (9) Silent Service
- 18 (-) Booty
- 19 (10) Fingers Malone
- 20 (11) Thrust

Elite
Imagine
Firebird
Mastertronic
Mastertronic
US Gold
Mastertronic
Gremlin Graphics
Elite
Mastertronic



Ninja

Mirrorsoft
Mastertronic
Mastertronic
Hit Squad
Mastertronic
Gargoyle Games
Microprose/US Gold
Firebird
Mastertronic
Firebird

NEXT WEEK

The missing Amstrad supplement turns up at last including: Amstrad graphics. Full report of the recent Amstrad show. Profile of Amstrad stalwart CP Software.

● Go Forth

Continuing our series on alternatives to Basic, we look at one of the longest-established languages, Forth.

Top Tens

Amstrad

- 1 (2) Kane (Mastertronic)
- 2 (3) Green Beret (Imagine)
- 3 (NE) Harvey Headbanger (Firebird)
- 4 (8) Kung Fu Master (US Gold)
- 5 (-) Tomahawk (Digital Integration)
- 6 (-) Heavy on the Magik (B Games)
- 7 (8) Radrone (Mastertronic)
- 8 (-) Boulder (Gremlin Graphics)
- 9 (-) Commando (Elite)
- 10 (-) Into Oblivion (Mastertronic)



Commando

All figures compiled by Gallup/Microscope

Commodore 64

- 1 (1) Green Beret (Imagine)
- 2 (-) Ghosts and Goblins (Elite)
- 3 (-) Ninja Master (Firebird)
- 4 (2) Silent Service (Microprose/US Gold)
- 5 (3) Thrust (Firebird)
- 6 (6) Bump Set Spike (Mastertronic)
- 7 (-) Stamball (Americana)
- 8 (-) International Karate (System 3)
- 9 (8) World Cup Carnival (US Gold)
- 10 (10) Formula One Simulator (M'Tronic)

● PSS competition

The follow-up to Swords & Sorcery is coming. We give you a chance to make a contribution, get your name on the packaging and win some great prizes in the bargain.

Atari

- 1 (1) Kik Start (Mastertronic)
- 2 (-) Last V8 (Mastertronic)
- 3 (2) Vegas Jackpot (Mastertronic)
- 4 (4) Action Biker (Mastertronic)
- 5 (7) New York City (Americana)
- 6 (8) One Man and his Droid (M'Tronic)
- 7 (8) Shamus (Americana)
- 8 (-) Shamus (Americana)
- 9 (-) Clock of Death (Begbyte)
- 10 (-) Savage Pond (Begbyte)

BBC

- 1 (8) Commando (Elite)
- 2 (4) Winter Olympics (Tynesoft)
- 3 (-) Ian Botham T. Cricket (Tynesoft)
- 4 (-) Karate Combat (Superior)
- 5 (-) Phantom Combat (Doctor Soft)
- 6 (-) Mini Office 2 (Database)
- 7 (-) Bruce Lee (US Gold)
- 8 (-) Star Force 7 (Begbyte)
- 9 (-) Jack Attack (Begbyte)
- 10 (1) Tennis (Begbyte)

Spectrum

- 1 (1) Ghosts and Goblins (Elite)
- 2 (4) Ninja Master (Firebird)
- 3 (5) Molecule Man (Mastertronic)
- 4 (2) Knight Time (Mastertronic)
- 5 (6) Green Beret (Imagine)
- 6 (-) Heavy on the Magik (B Games)
- 7 (9) Conquest (Mastertronic)
- 8 (5) World Cup Carnival (US Gold)
- 9 (-) Biggles (Microprose)
- 10 (-) Formula One Simulator (M'Tronic)

● Plus

The hottest news in the business, the latest reviews and the regular crew of Messrs Bridge, Kendall, Jenkins et al.

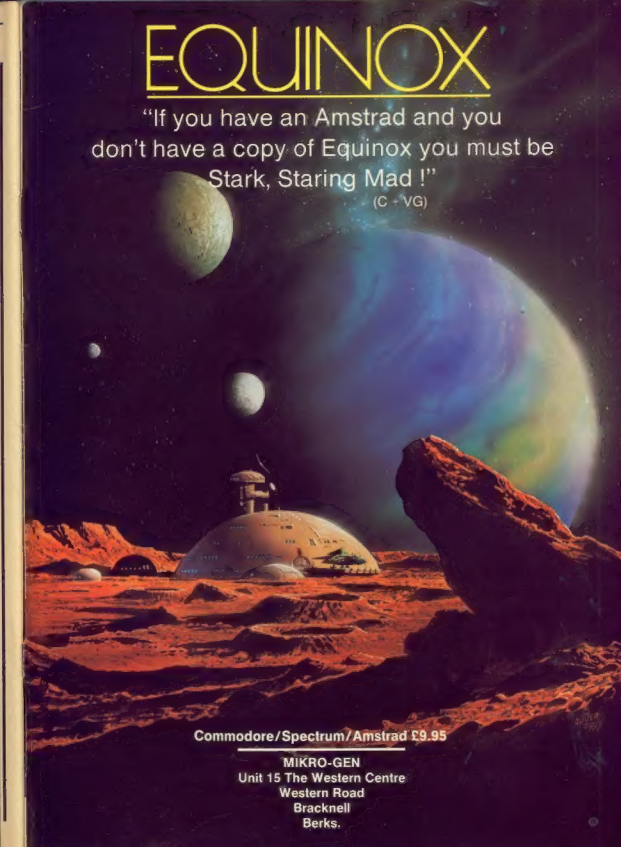
The Hackers



EQUINOX

"If you have an Amstrad and you
don't have a copy of Equinox you must be
Stark, Staring Mad !"

(C + VG)



Commodore/Spectrum/Amstrad £9.95

MIKRO-GEN
Unit 15 The Western Centre
Western Road
Bracknell
Berks.

GET YOUR NAME ON THE

LEADERBOARD

If you have ever bought another golf simulator – shoot yourself!
If you are ever considering it – save yourself a bullet!
ZZAP64

Quite honestly, leaderboard makes all other golf simulations look clumsy and antiquated in comparison.
ZZAP64

This is the sports simulation of the year – if not the decade!
ZZAP64



And swing your way to a record round

Now you can become a golf pro and experience the thrill of having your name up on the "Leaderboard". With this amazingly realistic simulation you get a true perspective view of your golf game. As you play on different 18 hole courses on levels varying from amateur to touring professional you'll need skill concentration and control to come in under par.

CBM 64/128 Coming soon for Spectrum and Amstrad

Features:

- Choice of club, distance, type of shot (hook, slice, putting) and more
- Realistic Sound
- Practice Driving Range
- Joystick Controlled
- Multiple 18 Hole Golf Courses
- Automatic Scoring

